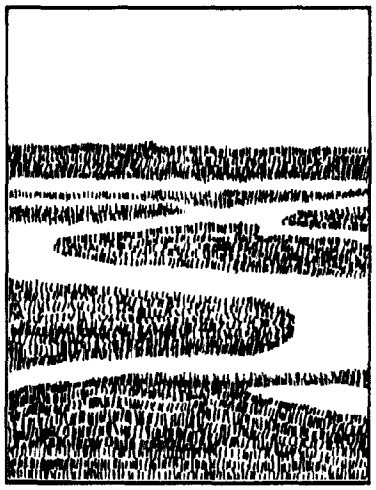

An Analysis of Coastal Growth and Development in North Carolina

Neil Alan Armingeon

May 1989

ivision of Coastal Management
orth Carolina Department of Natural Resources and Community Development

AN ANALYSIS OF COASTAL GROWTH AND DEVELOPMENT IN NORTH CAROLINA SINCE THE ENACTMENT OF THE COASTAL AREA MANAGEMENT ACT.

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Final Report Submitted to:

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ABSTRACT

This paper analyzes growth and development in North Carolina's 20 coastal counties since the enactment of the Coastal Area Management Act (CAMA). The data includes: CAMA permitting trends, population growth and projections, travel and tourism expenditures, a questionnaire regarding CAMA and coastal development, and residential building permits. CAMA permitting began in 1978, and the total number of permits issued increased steadily until 1986. Permitting trends vary from county to county, however, in 1986 and 1987, Brunswick, Dare, and Carteret Counties accounted for over 60 percent of the total CAMA permits issued. During the period from 1980 to 1986, four of the five fastest growing counties in the state were located in the coastal region. Projected permanent population estimates indicate that many coastal counties' populations will continue to increase at a rate that is above the state's projected growth. Tourism is the fastest growing industry in the coastal region. Since 1971, the coastal counties' travel and tourism revenues has increased by almost 9 times. The majority of those who responded to the questionnaire indicated that CAMA regulations have not had a negative effect on the construction industry (i.e., slowed building). Federal and state agencies use building permits as an economic index of the construction industry. To quantitatively determine CAMA's effects on the housing industry, residential (single- and multi-family unit) building permit data for the coastal counties were compared to state-wide building permit data. From 1978 to 1986, the issuance rate of building permits in the 20 coastal counties exceeded the permit issuance rate state-wide. Data analysis suggests that CAMA procedures or regulations have not slowed growth or development in North Carolina's 20 coastal counties.

ACKNOWLEDGEMENTS

The Author wishes to express his gratitude to the following people: Rich Shaw, Division of Coastal Management (DCM), for his patient guidance, help with the manuscript, and his support; Melissa McCullough, The Environmental Protection Agency, for her assistance in the intial stages of this project; Dr. Robert G. Healy, School of Forestry and Environmental Studies, Duke University, for "adopting" me as his advisee, and for his helpful suggestions and continuing support; George Matthis and John Parker, DCM, for their help with CAMA permit data; Mona Riggins, DCM, for her patience, phone directories, and assistance with the land use plans; Jeannette Holmes, DCM, for her assistance with the graphics; The Staff of DCM in Raleigh, for their laughter and support; Tom Harper, NC Travel and Tourism, for his patience and assistance; Celia Fuller, Office of State Budget and Management, for her help with the data collection; Walter Clark and Lundie Spence, UNC Sea Grant Program, for "planting the seed" and their friendship and encouragement; and finally to the citizens of North Carolina's coastal counties for sharing your knowledge, insight, and beautiful homeland with a "Dit Dot" from Duke.

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INTRODUCTION

Since it was first introduced in the General Assembly in 1973, the Coastal Area Management Act (CAMA) has been both a force for orderly growth and a hub of controversy. In 1974, after one of the longest and most turbulent legislative debates in North Carolina history, CAMA emerged as an experiment in land use planning for the 20 coastal counties. Coastal legislators opposed the program fearing it would stymie development and usurp local government's authority to direct local growth patterns (Olson, 1989; Finger and Jacobs, 1982). The debate concerning CAMA was so emotional, that for the first time in the state's history, a legislative committee held public hearings up and down the coast. The bill was actually voted down in the Senate, but its sponsors, granted a one night reprieve, struck a compromise that swung 15 votes their way (Olson, 1989).

> In attempting to balance "the often conflicting needs", as the act's preamble states, "of a society expanding in industrial development, in population, and in the recreational aspirations of its citizens", CAMA has stirred strong opposition every step of the way (Finger and Jacobs, 1982).

Today, 15 years after CAMA's stormy passage, North Carolina's coastal management program is considered a model for other coastal states (Owens, 1985). CAMA functions on the principle that it is appropriate for government to operate in the interest of all the state's citizens by placing reasonable restrictions on coastal growth and development (Finger and Jacobs, 1982). State-level management has proven to be an ideal tool for balancing national, state-wide, and local management concerns (Owens, 1985). This "balancing act", encouraging economic growth while protecting fragile environments, is CAMA's difficult mission.

To date, CAMA has been effective in solving its first order problems---establishing a management framework and the means for conflict resolution; managing development in hazardous ocean-front areas; and preventing environmental degradation such as filling and dredging of salt marshes (Owens, 1985). The success of CAMA's management plans, however, is linked to controversy. CAMA did eliminate the need for some permits, but the permitting process is more carefully scrutinized. One developer, recently interviewed, noted, "The regulations are so complex...it's almost impossible for anyone to understand them and follow them the way they should be followed" (Olson, 1989).

Due to increasing development in the coastal area, CAMA's regulations, as well as other state and federal environmental regulations, have become more stringent. A review of a major permit involves soliciting comments about the project from 14 other state and federal agencies. Some of CAMA's opponents

believe that the cost of these regulations is a slowing of the region's economic growth (Olson, 1989; Finger and Jacobs, 1982). The controversy regarding the economic effects of CAMA has persisted since the statute's enactment. This dispute is the basis of this paper.

It is difficult to assess the impacts of CAMA on coastal growth. A previous study determined that CAMA regulations did not restrict the ability of the landowners to use their land, however, that study was conducted over eight years ago (Liner, 1980). Since that study, the North Carolina coastal region has undergone rapid growth and development. Has this growth, however, been altered or reduced by the policies and procedures of CAMA?

Today, the coastal region is the fastest growing area in the state. Of the five counties in the state experiencing the greatest population increases, four are coastal counties (OSBM, 1988). To understand growth in North Carolina's coastal region, one must consider many interrelated factors.

This study addresses growth and development in the 20 coastal counties since the enactment of the Coastal Area Management Act. Data analysis includes population growth, CAMA permitting trends, and travel and tourism expenditures. The final section focuses on the question of whether or not CAMA regulations have had an adverse effect on the building trades in the coastal counties. To obtain public opinions regarding CAMA and development, a questionnaire was administered to county planners, local CAMA permit officers, and representatives of the North Carolina Home Builders Association. To quantitatively determine CAMA's effects on housing starts, residential (single- and Multi-family unit) building permit issuance rates in the the coastal counties are compared to state-wide issuance rates. The results of this comparison provide a method for determining CAMA's economic effects on one segment of growth, the housing industry. Finally, management recommendations based on the analysis of these data are presented.

SUMMARY OF RESULTS

The Coastal Area Management Act (CAMA) has now been in effect for 15 years. During this period, the 20 coastal counties that are regulated by CAMA have changed dramatically. The purpose of this document was to provide the reader with a broad overview of the growth and development that has altered not only the coastal ecosystem, but also the lives of the citizens who share these systems. Although a tremendous amount of data was introduced, the author hopes that the discussions, the analysis, and the results were clearly explained and easily understood. This section summarizes the salient points of this study.

- Although Europeans visited North Carolina's coastline 400 years ago, the inception of recent development occurred in the mid-1800s. As access to the Outer Banks improved growth and development increased.

- Land use in coastal areas is regulated by the same kind of federal, state, and local laws that govern land use throughout the country. Because of the environmentally complex nature of coastal areas and the public's special interest in preserving the unique environment of the coast, coastal lands are generally subject to more laws and regulations than inland properties.

- The Coastal Area Management Act (CAMA) was enacted by the General Assembly in the 1974 Session. The Act provided a system capable of preserving and managing the ecological conditions of the barrier dune systems, beaches, and estuarine systems, while insuring the economic development of the coastal area.

- CAMA established a "two-tiered" management approach. The first tier involves the regulation of development in designated Areas of Environmental Concern (AECs). The second tier involves land use planning for each county.

- CAMA regulations are controversial. Opponents believe that: 1) CAMA allows state intervention into private property rights, and 2) the CAMA permitting process has had a negative effect on coastal building activity.

- CAMA permitting began in 1978 and the total number of permits issued increased steadily until 1986. Since 1986, however, the total number of permits issued has fallen annually.

- The general permit, introduced in 1983, was the principal permit type issued by DCM during 1987 and 1988.

- CAMA permitting trends vary from county to county, however, in 1986 and 1987, Brunswick, Dare, and Carteret Counties accounted for over 60 percent of the permits issued.

- During the period from 1980 to 1986, four of the five fastest growing counties in the state were located in the coastal region. Some coastal counties are experiencing permanent population increases of four to six times that of the state's growth rate.

- Projected permanent population estimates indicate that many coastal counties' populations will continue to increase at a rate that is above the state's projected growth.

- Some beach communities are experiencing "peak seasonal" population increases 40 to 50 times that of the permanent population.

- Tourism is the fastest growing industry in the coastal region. Since 1971, the 20 coastal counties' travel and tourism revenues have increased by almost 9 times.

- In 1987, the coastal region's share of travel expenditures was over 20 percent of the state's total. In some coastal counties, as many as 40 percent of the total work force are employed by the travel and tourism industry.

- The majority of coastal county planners and Local CAMA Permit Officers who responded to a questionnaire regarding CAMA regulations and coastal development indicated that CAMA regulations have not had a negative effect on the construction industry (i.e., slowed building).

- Federal and state agencies use building permits as an economic index of the construction industry. From 1978 to 1986, the issuance rate of building permits in the 20 coastal counties exceeded the permit issuance rate state-wide. In specific coastal counties, building permit issuance rates exceeded that of the state by as much as four times.

- Data analysis suggests that CAMA procedures or regulations have not slowed growth or development in North Carolina's 20 coastal counties.

BACKGROUND

The first Europeans visited coastal North Carolina about 400 years ago, and settlements north of Albemarle Sound began soon afterward. Southern migration to the Pamlico shore led to the establishment of Bath, the oldest incorporated town in the state (Bellis, et al., 1976; Copeland et al., 1984).

The main activities of the early settlers included shipping, fishing, farming, and timber production (Copeland et al., 1984). In some respects, the landscape encountered by these early residents was very similar to today's: shallow brackish sounds and lagoons, extensive grass marshes, large swamp forests of bald cypress and mixed hardwoods reaching inland along the riverine floodplains, and scattered areas of pines and upland hardwoods (Bellis et al., 1976).

The virgin timber stands that covered the sound regions were well suited for the burgeoning ship and boat building industry. In addition, the native pine produced valuable naval stores (tar, pitch, turpentine, and rosin), which became a primary export of colonial North Carolina. Numerous plantations were established in the Albemarle Sound region as large expanses of land were cleared for timber and farming (Stick, 1982). Slowly, the landscape of coastal North Carolina began to change.

The abundant resources encouraged additional settlement. The population, although still sparse, grew with the introduction of new farming and timber operations. These early settlements established a pattern that generally persists today along the coast. The pattern includes: numerous communities and small towns on or near the water; farms surrounding the towns; forests, providing raw materials for export and local use; and miles of coastal waters yielding shellfish and finfish (Stick, 1982).

For the early settlers, the rich farmlands, timber resources, and abundant wildlife, were the major attractions of the coastal region. However, the pristine waters and 300 miles of ocean shoreline began to encourage recreational activities.

Although Portsmouth, Ocracoke, and Beaufort were visited by summer vacationers as early as the mid-1700s, Nags Head became the first important seashore resort. The community grew quickly in the 1830s, and it was a flourishing resort by the beginning of the Civil War (Pilkey et al., 1978). Morehead City emerged in the late 1850s as a resort to rival Nags Head. The community was built on the mainland to improve accessibility and to better endure storms and hurricanes (Pilkey et al., 1978). In the late 1800s, the Ocean View Railroad was constructed from Wilmington to Wrightsville Beach; thus, a new shoreline was opened for development (Pilkey et al., 1978). On Bogue Banks, Alantic Beach began developed with the construction of several dance pavilions in the early 1900s. The first bridge to Bogue Banks,

completed in 1928, further increased growth on the barrier islands (Pilkey et al., 1978). A new and important industry evolved in North Carolina: tourism.

Early development of the coastal region was slow. Access to the area was limited, and social and political pressure to build bridges to the barrier islands was not particularly strong (Pilkey et al., 1978). State sponsored ferry service and the completion of more bridges in the 1940s improved access to the coastal areas, and development activities began to increase.

In the 1950s and 60s, the traditional fishing camps and sparsely developed beaches were replaced by beach communities dominated by single-family cottages and small motels. The 1970 National Estuarine Study classified large areas of North Carolina's northeastern and southern coastline as relatively unmodified (Miller and Rublee, 1981). Since that study, however, the region has changed significantly.

Interest in the North Carolina coastal zone has risen dramatically in recent years. The 1970s and 80s have seen the introduction of high-rise condominiums, time share residential ventures, golf courses, and planned communities built around large marinas (Owens, 1985). Increasing population and subsequent economic growth magnify demands for resources and space. Coinciding with these demands are changing values within the population that place greater emphasis on the quality of life (Miller and Rublee, 1981). The coastal region is the focus of many competing demands, which include: national defense, commerce, energy development, real estate development, recreation, and conservation (U.S. Department of the Interior, 1987). Thus, managing the state's coastal resources is a complex task.

Land use in coastal areas is regulated by the same kind of federal, state, and local laws that govern land use throughout the country. For numerous reasons, however, coastal lands are generally subject to more laws and regulation than inland properties (Liner, 1980). These reasons include: the environmentally complex nature of coastal areas, the economic value of estuarine systems, the public's special interest in preserving the unique natural environment of the coast, and finally, accelerated development pressures can cause severe detrimental consequences in fragile coastal ecosystems (Liner, 1980).

In North Carolina, the coalescence of these issues led to the enactment of the Coastal Area Management Act (CAMA) in 1974. Before passage, the law was subjected to the most intense scrutiny and debate ever experienced by a environmental bill in the state's history (Owens, 1987). This debate continues today. Proponents of CAMA believe the bill has shaped coastal development in a positive way, and that it is protecting valuable coastal resources

for future generations. One of the major criticisms of CAMA is that it takes land use controls away from property owners and in some cases, has caused slowed economic growth in coastal areas. Opponents add that no other area in North Carolina is subjected to this type of state regulation; CAMA represents heavy handed state intrusions into the affairs of landowners in coastal areas (Heath and Mosley, 1980).

The CAMA regulatory process applies to the Areas of Environmental Concern (AECs). AECs, however, comprise only three percent of the total land area of the 20 coastal counties. Analyzing CAMA's financial impacts is a complicated undertaking that depends on many complex variables. A previous study indicated that permit decisions alter construction standards and methods of development but noted, "...[I]n general, regulations under CAMA and the Dredge and Fill Law (a part of the permit process) have not substantially restricted the ability of the landowners to use their land" (Liner, 1980). CAMA was not written to to be antagonistic toward coastal development, nor was it designed to prevent coastal development. To the contrary, one of the goals of CAMA is to manage "[T]he economic development of the coastal area, including but not limited to construction, location and design of industries, port facilities, commercial establishments and other developments (N.C.G.S. 113A-102 (b), Liner, 1980). Despite this mandate and the previous study's conclusions, the question remains, has CAMA affected growth and development in the coastal areas?

Although the debate regarding CAMA's impacts on economic growth continues, one fact is certain, since the enactment of CAMA the 20 coastal counties have undergone many changes. Using selected parameters, this study delineates and analyzes coastal growth and development that has occurred since the early 70s.

The report is divided into two sections. The first section examines the growth that has occurred in the 20 coastal counties regulated by CAMA. The study period begins in 1970, prior to the passage of CAMA, and ends with 1988 data. These data include CAMA permits, population trends, and travel and tourism expenditures. The final section focuses on the question of whether or not CAMA regulations have had an adverse effect on the building trades in the coastal counties.

STUDY AREA

The provisions of the Coastal Area Management Act (CAMA) apply to the 20 coastal counties located along the state's tidal rivers, sounds, and the Atlantic Ocean. Figure one shows the geographic area regulated by CAMA. The coastal counties are:

Beaufort	Hertford
Bertie	Hyde
Brunswick	New Hanover
Camden	Onslow
Carteret	Pamlico
Chowan	Pasquotank
Craven	Pender
Currituck	Perquimans
Dare	Tyrrell
Gates	Washington.

These counties represent a diverse mix of land uses, growth patterns, and economic development. In some cases, growth and development data will be presented for all 20 counties as a whole. Some data will be presented for individual counties. Six "case study counties" provide more detailed development trends for specific coastal regions.

The six counties were selected to represent: different geographic regions within the coast (i.e., northern vs. southern coast, inland vs. ocean front); differing rates of development and growth; and different economic growth rates. Figure two shows the location of the six counties. A brief description of the counties follows.

Beaufort is an inland county at the mouth of the Pamlico River in the central coastal region. As the ocean front counties become fully developed, it is predicted that growth will shift to the counties bordering the sounds. Planned Unit Developments (PUDs) built around marinas and golf courses are typical of this new development. Beaufort County, now experiencing this growth pattern, was selected to demonstrate development trends in sound-side counties.

Currituck is the northern-most ocean-front county. Although growing rapidly, its growth rate is much slower than other coastal counties. Northern access to Currituck Banks, the fastest growing area in the county, is limited. The county provides a chance to study how limited access has affected the county's growth patterns.

Dare, in the northern coastal region, is the fastest growing

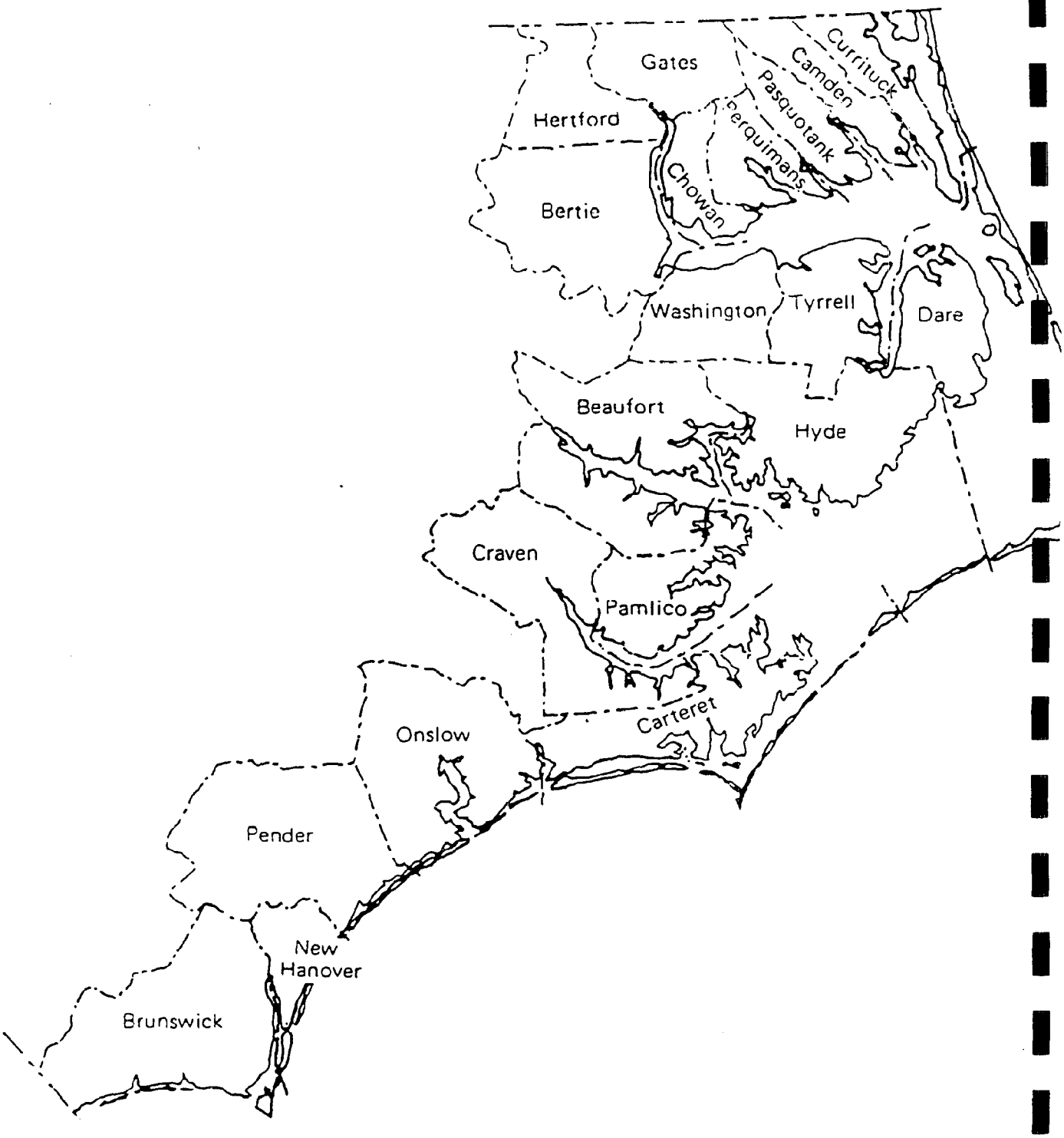


Figure 1. The 20 North Carolina counties regulated by the Coastal Area Management Act (CAMA)(Source: Division of Coastal Management, 1989).

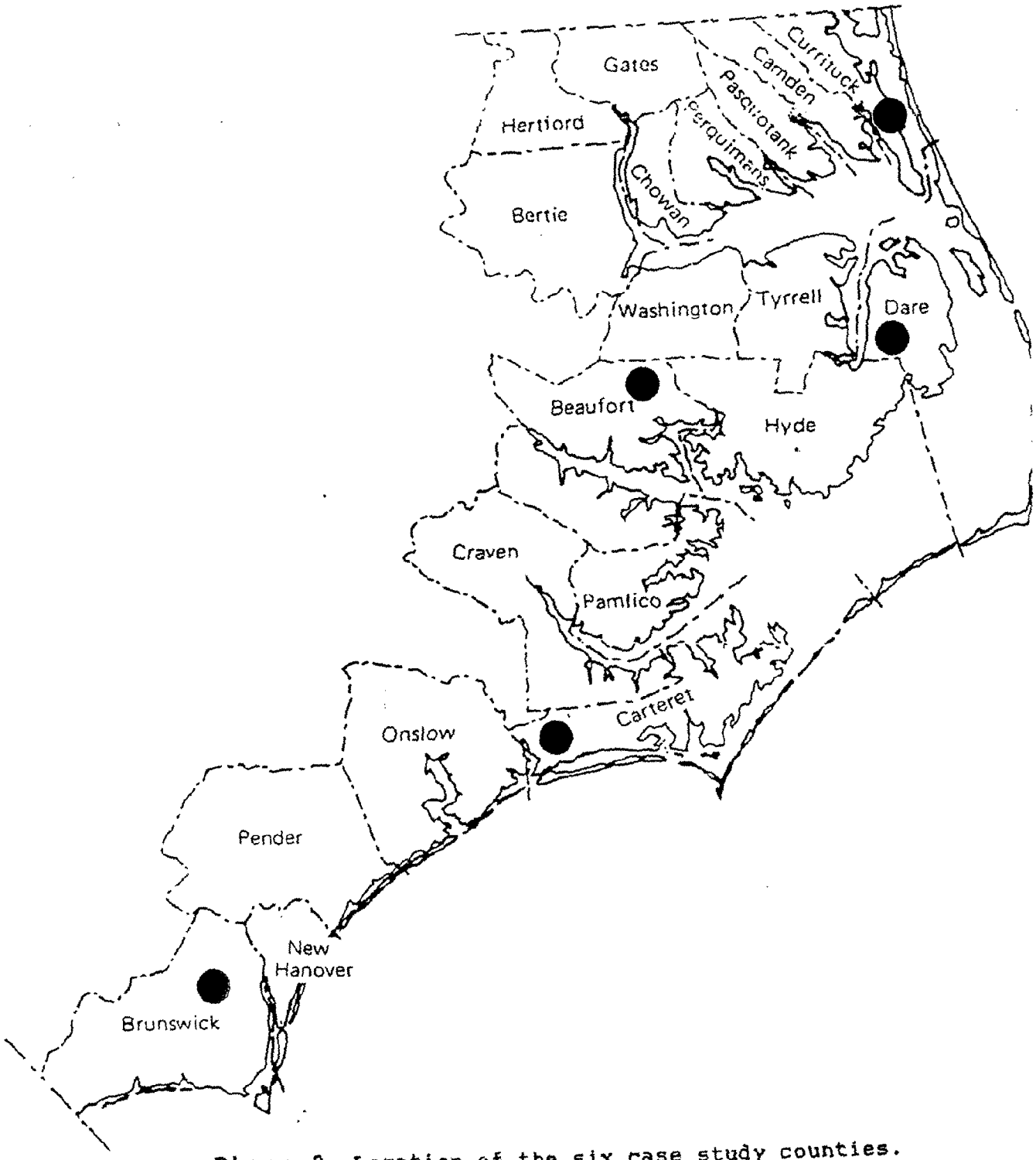


Figure 2. Location of the six case study counties. ● = case study county.

coastal county. The county is experiencing tremendous increases in both seasonal and permanent populations. Trends evident in Dare County could indicate future growth patterns for some of the slower growing Outer Banks ocean-front counties such as Currituck.

Carteret is a rapidly growing county in the central coastal area. Carteret County, bordering Bogue Sound and the Atlantic Ocean, was the last county to complete its land use plan. Rapid growth has caused an overloading of current wastewater treatment systems and subsequent water quality problems (Armingeon et al., 1989). Carteret County was selected because growth trends presented in this study might aid in the planning of public facilities for future use.

New Hanover is located in the southeastern part of the state. New Hanover County and Wilmington, the largest city in the coastal region, was one of the first coastal areas to employ a full-time planning department. The county was selected to exhibit growth trends in a county that utilized long term planning.

Brunswick is the southern-most coastal county. It was one of the last coastal counties to begin extensive development, but today it is one of the fastest growing of the CAMA regulated areas. The county was selected to compare growth in the southern region to that of the Northern region.

CAMA development permits, an indirect indicator of growth, are discussed in the following section.

CAMA PERMITS

Although the Coastal Area Management Act (CAMA) was ratified on April 12, 1974, the regulatory provisions did not go into effect until March 1978 (Parker, 1989). Under CAMA, the CRC is required to provide a simplified, coordinated system of permits for the coastal area. This is accomplished through the AEC regulatory program. As noted earlier, a CAMA permit is required for development in AECs. "The intent of CAMA's permit program is not to stop development, but rather to make sure that development within AECs does not threaten public safety or continued productivity and value of important natural areas" (DCM, 1988). A CAMA permit functions as a single application form for five separate state and federal project reviews: 1) The CAMA AEC development permit, 2) the State Division of Environmental Management water quality certification, 3) an easement required by the Department of Administration for placing fill material in public trust waters, 4) a State dredge-and-fill and coastal wetlands permit, and 5) a "404" permit for controlling the filling of wetlands as required by the federal Clean Water Act and administered by the U.S. Army Corps of Engineers (Finger and Jacobs, 1982).

This section presents CAMA permit data. The data, collected from Division of Coastal Management records, represents CAMA development permits issued during the period from Fiscal Year 1980 to Fiscal Year 1988 (the State's Fiscal Year is July 1 to June 30). First, to ascertain permitting trends for the entire coastal area, the total number of CAMA development permits are examined. Next, CAMA development permits for the case study counties are analyzed to determine permitting trends in these specific areas.

Figure three illustrates the coast-wide CAMA permit data. The total number of permits issued grew steadily from 1980 to 1986. The total permits, however, peaked in fiscal year 1986 and declined the following two years. Since fiscal year 1989 was not yet complete at this writing, it is impossible to determine if CAMA permits will continue to decline, or if 1986 represents the maximum permitting issuance period. The number of minor permits peaked in 1986 and declined the following two years. Major permits peaked in 1985, but have remained constant during the years that followed. One of the most interesting permitting trends concerns general permits. General permits were introduced in 1983 to streamline the CAMA permitting process. In some instances, the general permit can be issued the same day as the field visit by the permit officer. Since their introduction, the use of general permits is increasing and has not peaked. This growth coincides with the general decline in the issuance of major permits.

The six case study counties illustrate regional CAMA

permitting trends. Beaufort County experienced fluctuating permitting trends during the early 80s. From 1984 to 1986 the county showed a tremendous increase in total permits issued (Figure four). General permits represent much of this increase. In 1987, total permits issued decreased.

Currituck County experienced a constant increase in total permits from 1980 to 1987 (Figure five). Major permits grew steadily until 1986, but declined slightly in 1987. As in the case of Beaufort County, Currituck is also experiencing a growing use of general permits.

Dare County experienced fluctuating rates of permit growth during the study period (Figure six). The total number of permits declined in 1984, but rose sharply in 1986 and 87. There was constant growth in the issuance of major permits.

Carteret County, like Dare, experienced a tremendous increase in the total number of permits issued in 1986 and 87 (Figure seven). There was a notable increase in the number of major permits issued in 1987. The county, however, did not exhibit the rapid growth of general permits experienced by some counties.

New Hanover County experienced constant growth in total permits until 1984 (Figure eight). In 1986, this number declined substantially and remained constant the following year. There is little indication that general permits have become popular in this county.

Brunswick County presented the most noticeable shift in permit issuance trends (Figure nine). CAMA permits rose constantly from 1980 to 1984. In 1986, however, there was a tremendous increase in the total number of permits granted. Much of this activity was minor permitting. In 1987, there was a drastic decrease in the number of permits issued. The number of general permits issued in this county is small when compared to Dare or Beaufort.

As noted earlier, 1986 was the peak year for CAMA development permits. To further define permitting trends, the total permits for each of the six counties were compared to the total number of permits authorized in the remaining 14 counties. In 1986, the six counties represented 81.5 percent of CAMA permits issued (Figure 10). Brunswick County's total permits were almost 40 percent of the total. Carteret and Dare Counties combined for almost 25 percent of the total. These three counties represented over 62 percent of permitting activity during this year. During 1987, a similar trend was present (Figure 11). The six counties accounted for 87 percent of the total permits issued during the year. Carteret County accounted for 29 percent of the total development permits. Brunswick and Dare Counties combined for 34 percent of the total permitting activities. Although the number of CAMA permits has increased, it appears much of this growth is occurring

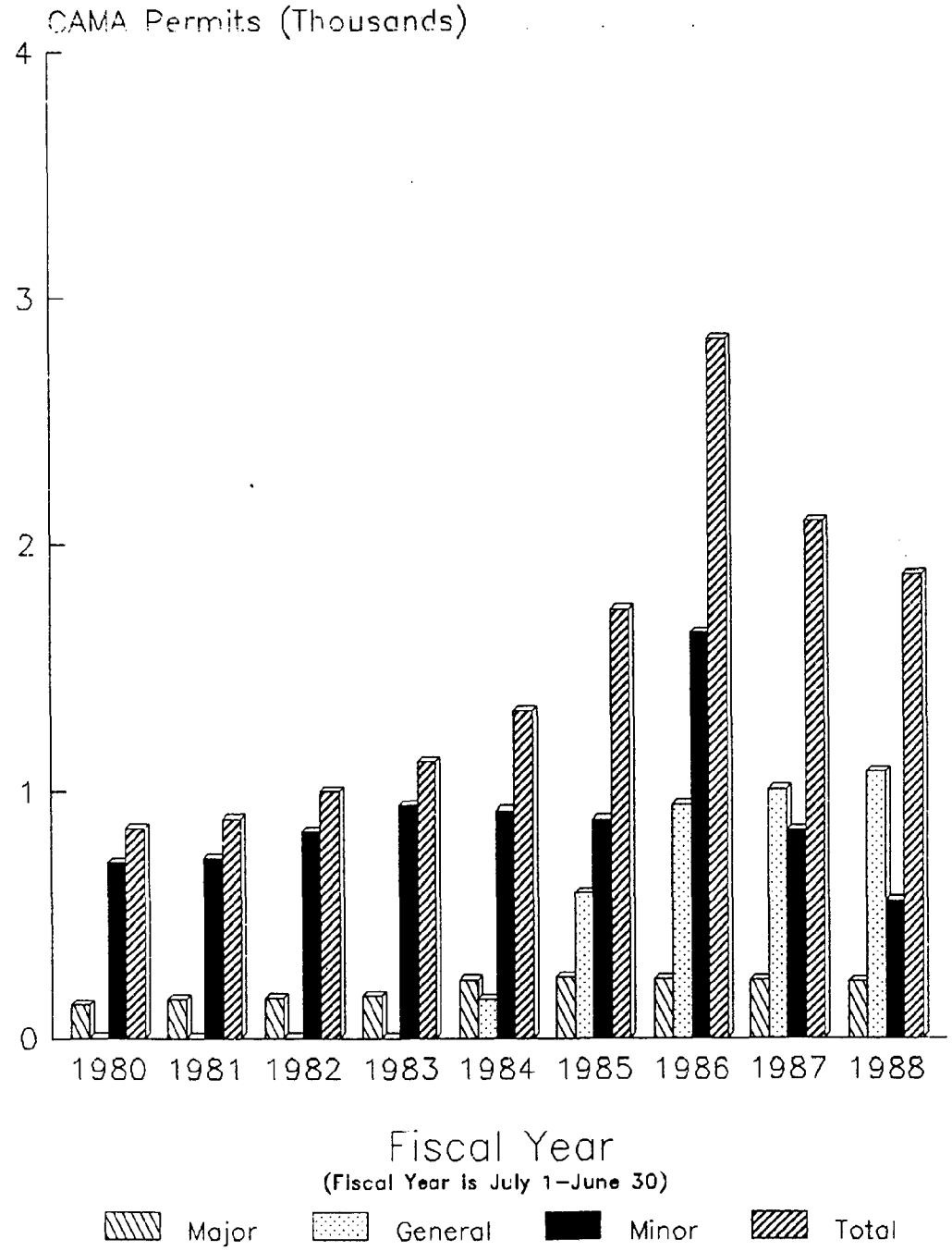


Figure 3. CAMA development permit trends for the 20 coastal counties regulated by CAMA. Shown are: major; minor; general; and total permits issued for Fiscal year 1980 to Fiscal year 1988 (Source: Division of Coastal Management, 1989).

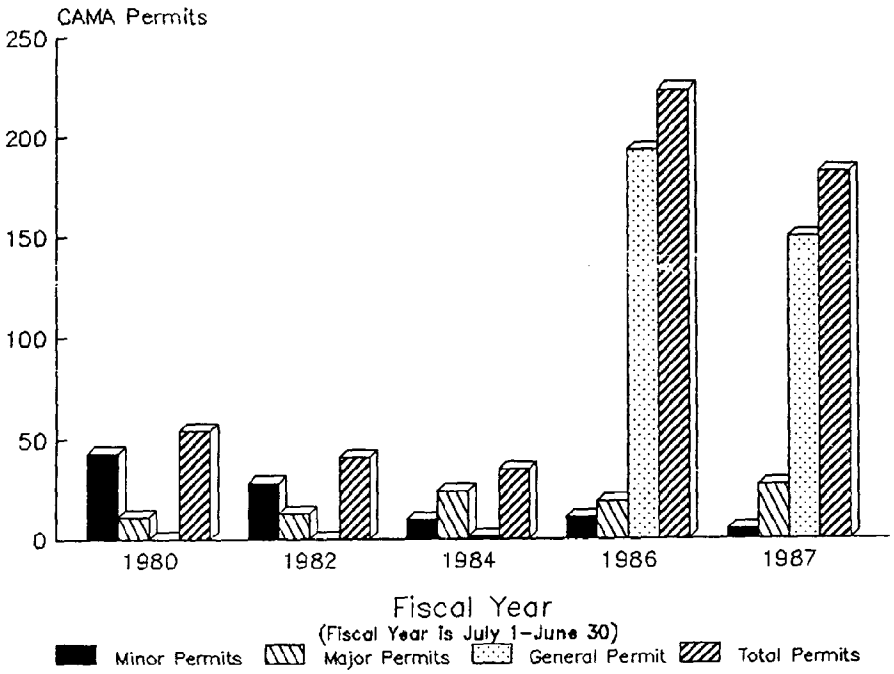


Figure 4. CAMA development permit trends for Beaufort County, N.C.. Shown are: major; minor; general; and total permits issued from Fiscal year 1980 to Fiscal year 1987 (Source: Division of Coastal Management, 1989).

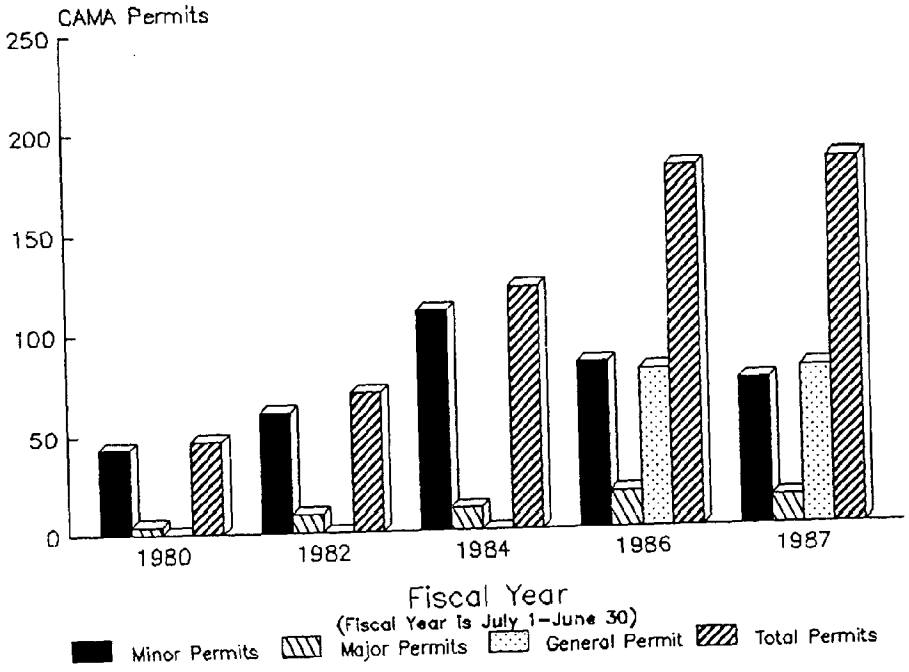


Figure 5. CAMA development permit trends for Currituck County, N.C.. Shown are: major; minor; general; and total permits issued from Fiscal year 1980 to Fiscal year 1987 (Source: Division of Coastal Management, 1989).

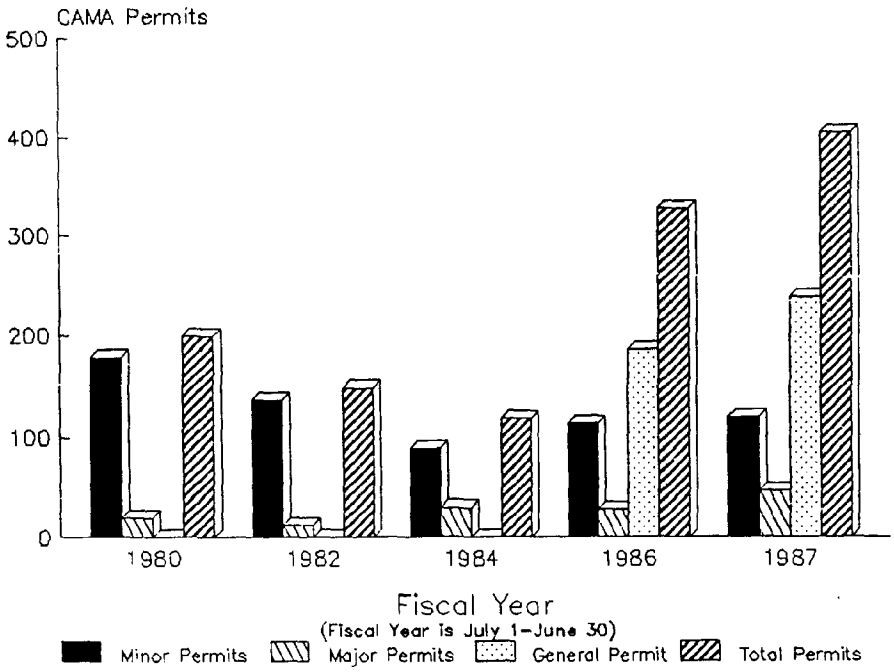


Figure 6. CAMA development permit trends for Dare County, N.C.. Shown are: major; minor; general; and total permits issued from Fiscal year 1980 to Fiscal year 1987 (Source: Division of Coastal Management, 1989) .

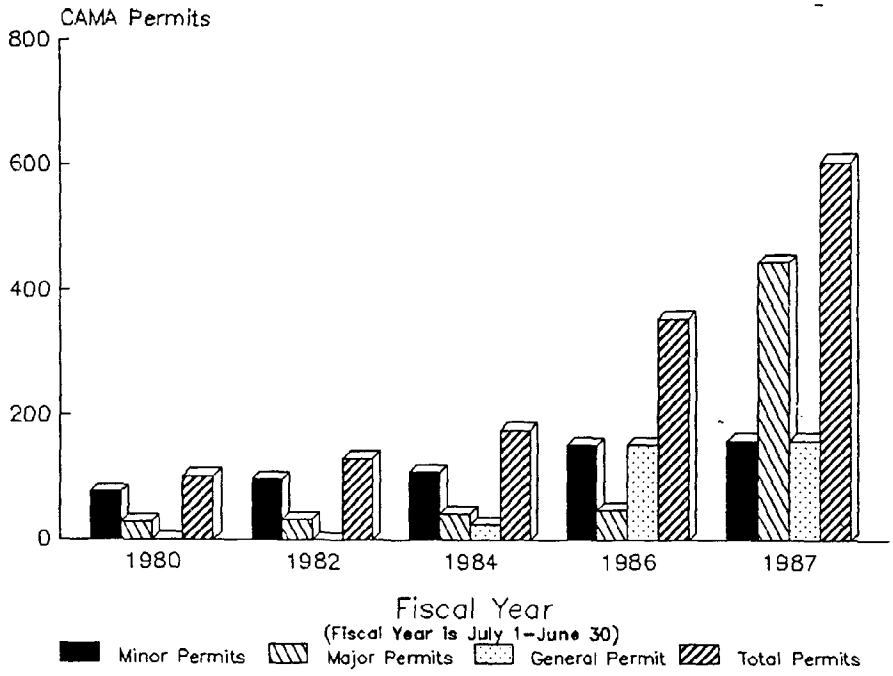


Figure 7. CAMA development permit trends for Carteret County, N.C.. Shown are: major; minor; general; and total permits issued from Fiscal year 1980 to Fiscal year 1987 (Source: Division of Coastal Management, 1989).

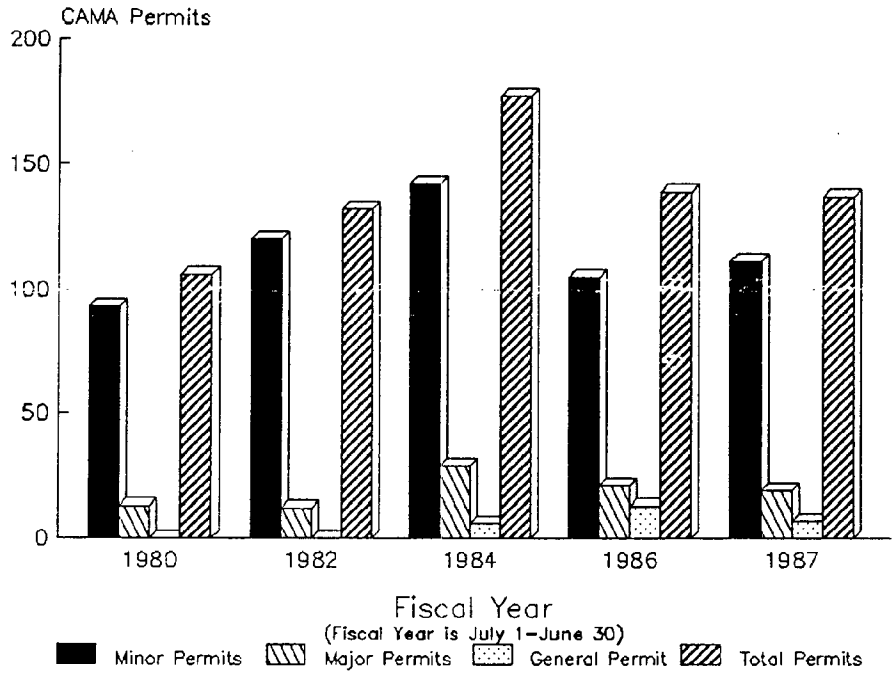


Figure 8 CAMA development permit trends for New Hanover County, N.C.. Shown are: major; minor; general; and total permits issued from Fiscal year 1980 to Fiscal year 1987 (Source: Division of Coastal Management, 1989).

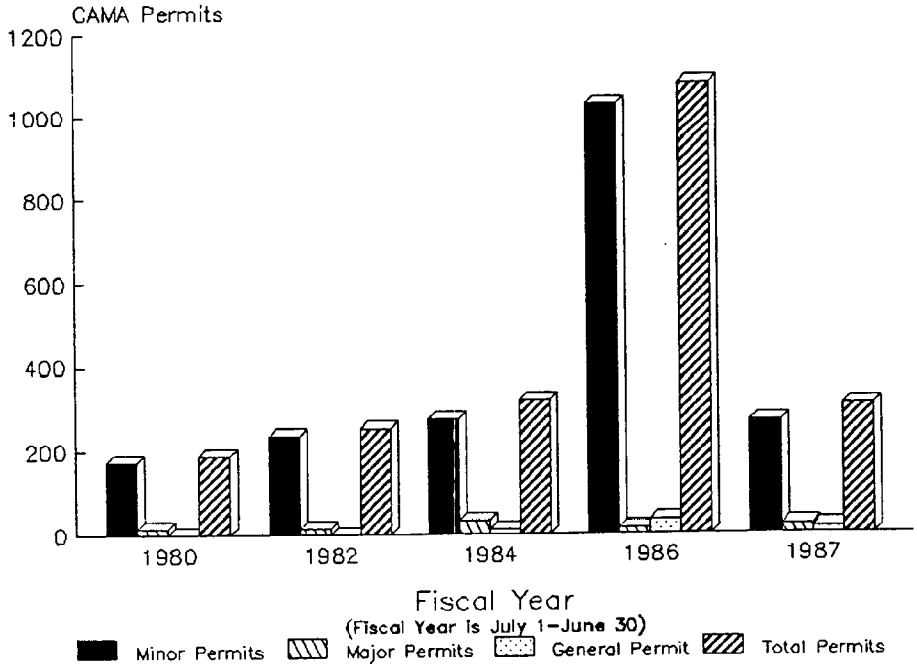


Figure 9. CAMA development permit trends for Brunswick County, N.C.. Included are: major; minor; general; and total permits issued from Fiscal year 1980 to Fiscal year 1987 (Source: Division of Coastal Management, 1989).

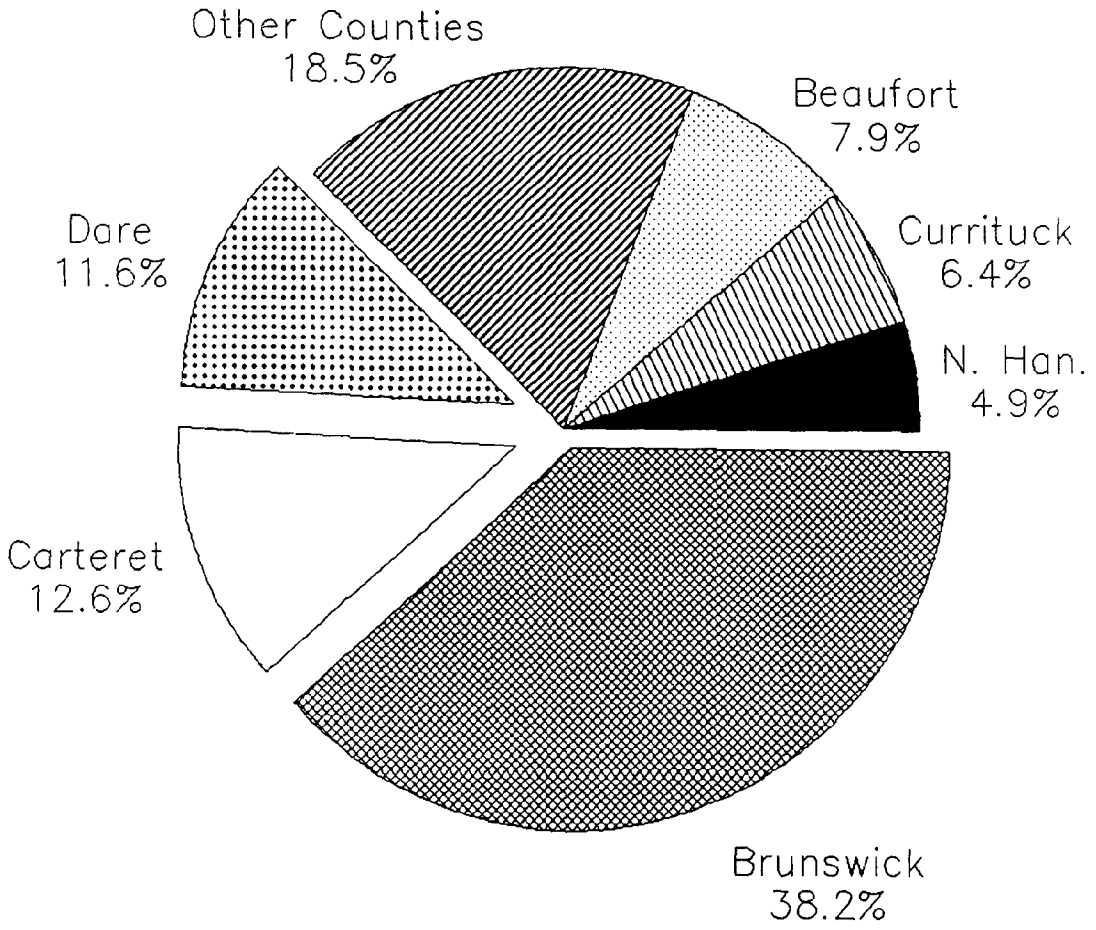


Figure 10. CAMA development permits (total) for Fiscal year 1986. Total number of permits issued for each of the six case study counties are shown as percentages of the total number of permits issued (Source: Division of Coastal Management, 1989).

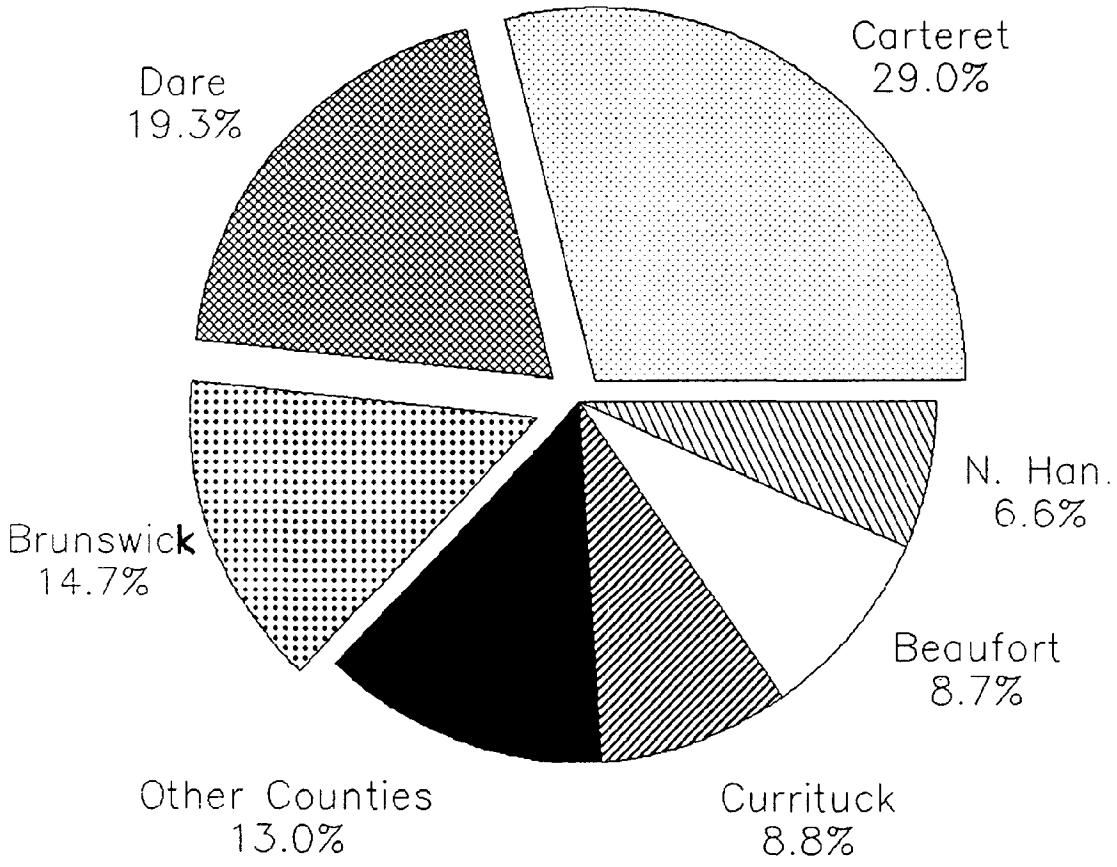


Figure 11. CAMA development permits (total) for Fiscal year 1987. Total number of permits issued for each of the six case study counties are shown a percentages of the total number of permits issued (Source: Division of Coastal Management, 1989).

in a small number of the counties regulated by the statute.

CAMA permits are issued for a variety of structures, such as a dwelling, or for a bulkhead or pier. Therefore, an examination of permits may not always indicate growth in a particular segment of the economy, e.g. the housing industry. Housing starts, an economic indicator, are examined in a later section. The next section analyzes population data for the 20 coastal counties.

POPULATION

Analyzing population data is a simple method for determining growth in a particular area and for comparing different counties or regions of the state. In the conventional land use planning process, analysis of population trends and future growth are often relatively uncomplicated procedures of collecting one set of figures from secondary sources. Sources for these data can be the U. S. Census Bureau or State agencies, and future growth trends are computed based on recent or existing trends.

Population in the coastal counties was analyzed because information regarding population growth and population growth projections is important for planning future coastal management strategies. Population data, including past, current, and future estimates will be discussed in this section.

Permanent Population Data

The number of permanent residents in an area can be determined with reasonable accuracy using census data. Population data for permanent residents were collected from the "North Carolina Population Projection Series", compiled by the North Carolina Office Of State Budget And Management (OSBM). Trend projections are based on the Adjusted Migration technique. "In general, trend projections are accurate only to the extent that the future repeats the past" (OSBM, 1988).

The initial population analysis will center on how rapidly the coastal counties' population are increasing, or in some cases decreasing. The population growth rate, or percent change in permanent populations, was computed for all 20 counties. These data were then compared to the overall growth rate of the state which served as a control. Coastal counties were loosely grouped by two criteria: 1) inland or ocean-front, and 2) geographic location (e.g. northern, central region etc.). Population comparisons are presented for two periods, 1970 to 1980 and 1980 to 1988. The 1988 data was based on OSBM projections. The inland counties will be discussed first.

Figure 12 presents population data for Bertie, Hertford, Gates, Chowan, and Perquimans Counties, all of which border the Albemarle Sound. These counties are in the northern coastal area. In the period 1970 to 1980, only Chowan County had a growth rate greater than the state's growth rate. During the period 1980 to 1988, Chowan County's population continued to increase, but at a rate which dropped below the state's growth rate. Hertford County lost population during the 1970s, but demonstrated a slight increase during 1980 to 1988 (OSBM, 1988). Gates County's growth rate was below that of the state during the 70s, but growth during the 80s equalled the state's growth rate. For the period 1980 to 1988, Perquimans County's population grew faster than the state. Bertie County was the

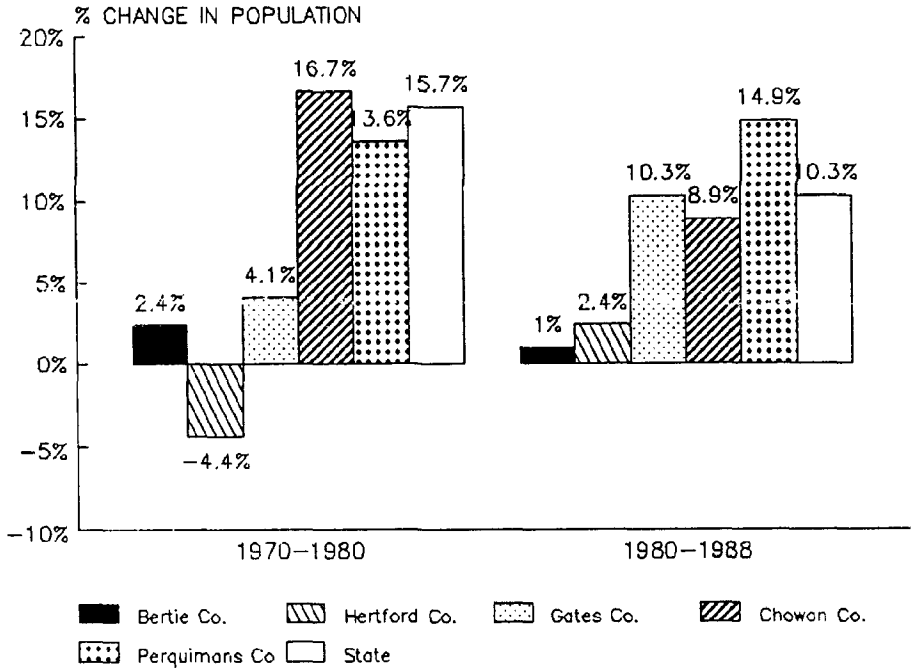


Figure 12. Permanent population growth rates for Bertie, Hertford, Gates, Chowan, and Perquimans Counties. The state's population growth rate is used for a control. Data are presented for 1970 to 1980, and 1980 to 1988 (Source: Office of State Budget and Management, 1988).

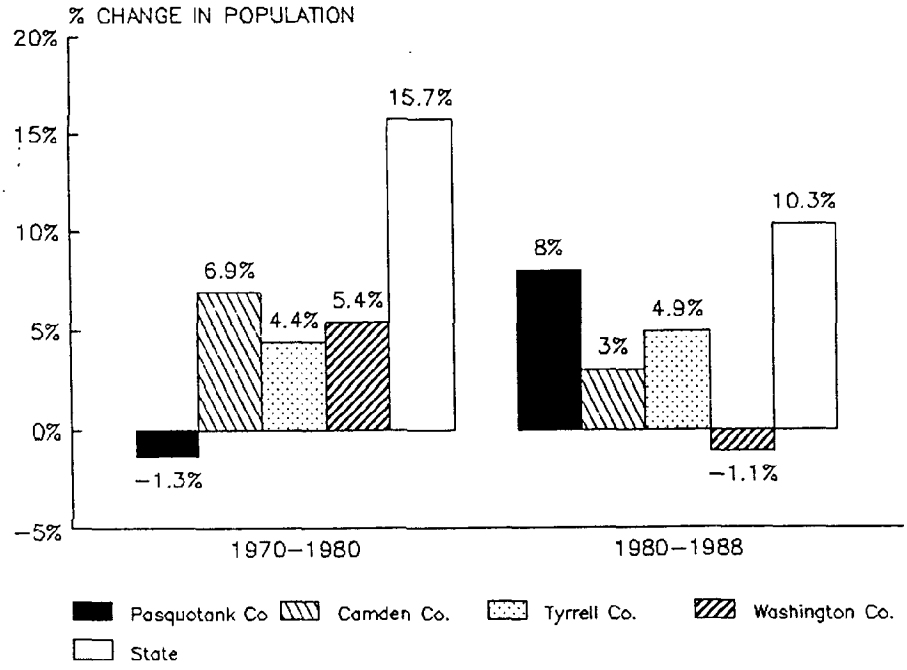


Figure 13. Permanent population growth rates for Pasquotank, Camden, Tyrrell, and Washington Counties. The state's population growth rate is used for a control. Data are presented for 1970 to 1980, and 1980 to 1988 (Source: Office of State Budget and Management, 1988).

slowest growing county in this group. In general, the inland counties in northeastern North Carolina are among the slowest growing of the CAMA regulated counties (OSMB, 1988).

Figure 13 illustrates data for Pasquotank, Camden, Tyrrell, and Washington Counties. These counties are in the northern coastal region and all border the Albemarle Sound. All four counties experienced growth well below the state's average for both study periods. Pasquotank County lost population during the 70s, but was the fastest growing county in this group in this decade. Washington County grew slowly during the 70s and has lost population since 1980 (OSMB, 1988).

Figure 14 presents data for Beaufort, Craven, and Pamlico counties. These counties are centrally located and border the Pamlico Sound. During 1970 to 1980, none of these counties grew at a rate that exceeded the state's growth rate. For the period 1980 to 1988, only Craven County's growth surpassed the state's increase. Beaufort and Pamlico Counties' growth rate fell by approximately half during the 80s (OSMB, 1988). Next, the discussion moves to the ocean-front counties where rapid population growth is occurring.

The growth rates in this group of ocean-front counties show drastic contrasts (Figure 15). Carteret, Currituck, and Dare Counties are among the fastest growing counties in the state. In the decade 1970 to 1980, Currituck County showed a population increase (+59.0%) of almost four times greater than the state; Currituck was the second fastest growing county in the state (OSMB, 1988; Currituck County, 1986). Currituck County's growth slowed during the second period, but was still two and one half times greater than the state's growth rate. From 1980 to 1986, the county was the fifth fastest growing county in the state. Dare County was the fastest growing county in the state during 1970 to 1980 (Dare County, 1988). It experienced a growth rate of +91.2 percent, almost six times greater than the state rate. The county's growth slowed to 56.3 percent for the second period, but it was still five and one half times the state's growth rate. From 1980 to 1986, Dare County remained the fastest growing county in the state (OSMB, 1988). Carteret County grew at a rate that was double the state's growth rate during the 70s, and is now experiencing growth approximately two and one half times the state's current rate. Hyde County has only a small ocean-front area (Ocracoke Island); the majority of the county borders the Pamlico Sound. Hyde County's growth rate is well below the rates of other ocean-front counties, falling almost two percent from 1980 to 1988 (OSMB, 1988).

Figure 16 illustrates the data for Pender, Onslow, New Hanover, and Brunswick Counties. This group of counties represent the fastest growing region in the coast and in the state (Mather, 1988; OSMB, 1988). In the period from 1970 to 1980 only Onslow County grew at a rate below the state

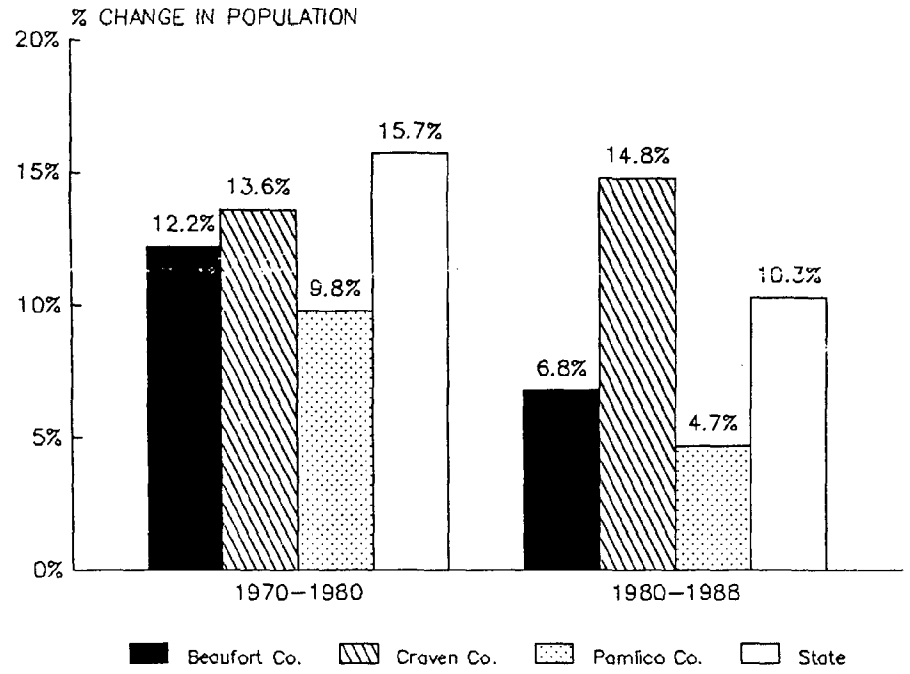


Figure 14. Permanent population growth rates for Beaufort, Craven, and Pamlico Counties. The state's population growth rate is used for a control. Data are presented for 1970 to 1980, and 1980 to 1988 (Source: Office of State Budget and Management, 1988).

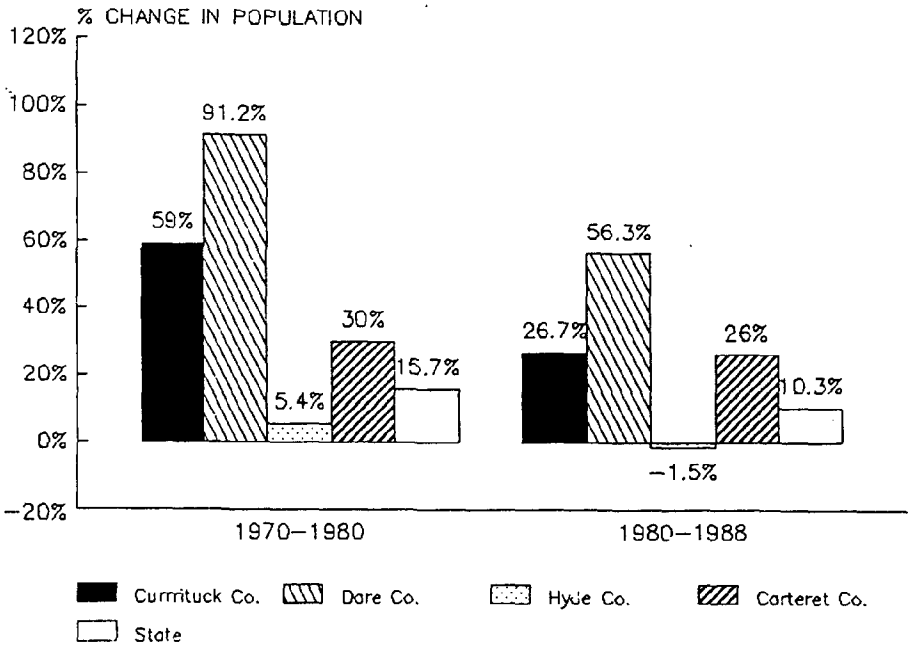


Figure 15. Permanent population growth rates for Carteret, Currituck, Dare and Hyde Counties. The state's population growth rate is used for a control. Date are presented for 1970 to 1980, and 1980 to 1988 (Source: Office of State Budget and Management, 1988).

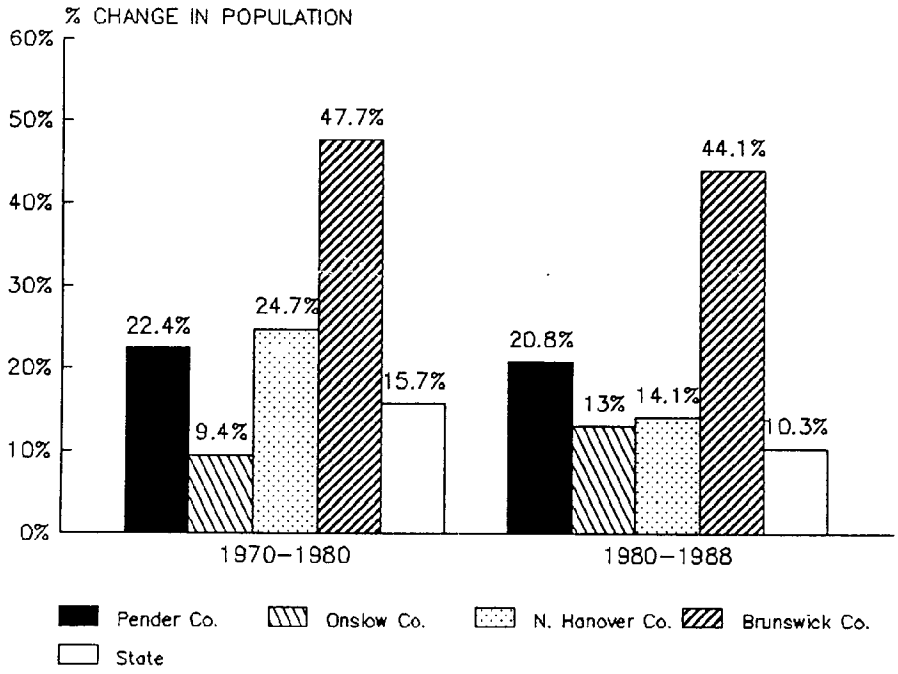


Figure 16. Permanent population growth rates for Pender, Onslow, New Hanover, and Brunswick Counties. The state's population growth rate is used for a control. Data are presented for 1970 to 1980, and 1980 to 1988 (Source: Office of State Budget and Management, 1988).

increase. Brunswick County grew at a rate of 47.7 percent, or three times greater than the state. From 1980 to 1986, Brunswick County was the second fastest growing county in the state, and the county is expected to grow at approximately the same rate during the remainder of this decade (OSBM, 1988; Brunswick County, 1987). For the period 1970 to 1980, New Hanover County's growth rate was well above that of the rest of the state. Growth has slowed during the current decade, although it still remains above the state average. Pender County is experiencing growth rates greater the New Hanover County, and over twice the State's growth. In this group, only Onslow County failed to surpass the state's growth rate during the 1970s, however, it too is now experiencing growth above state-wide levels (OSBM, 1988).

Future Population Estimates

Future population projections for the six case study counties are illustrated in Figures 17 and 18. Population estimates, obtained from OSBM, are for permanent populations based on current trends. Each county's projected growth is compared to the state's growth for the same period. As in the previous section, the rate of population increase is shown as a percentage. Projections are made for two periods, 1990 to 2000 and 2000 to 2010.

Figure 17 illustrates the projected growth rates for Beaufort, Currituck, and Dare Counties. For the period 1990 to 2000, Dare County is projected to grow at a rate of four times that projected for the state. Currituck County is projected to increase at a rate of two and one half times that of the state. Beaufort County's growth is not expected to surpass the state's growth rate. For the decade 2000 to 2010, all three counties indicate a slowing rate of population growth. Dare and Currituck Counties, however, are projected to experience growth much greater than the state. Beaufort County's growth is expected to be less than the state's projected growth (OSBM, 1988).

Figure 18 represents projected growth rates for Brunswick, Carteret, and New Hanover Counties. For the period 1990 to 2000, all counties are projected to experience growth rates slower than those of the previous decade. Brunswick County is likely to experience population increase at a rate of almost four times the state's projected rate. Carteret County's projected growth will is estimated to be twice the state's. New Hanover County should experience population growth slightly higher than the state's growth. For the period 2000 to 2010, population growth rates are projected to decline for all of these counties, however, Brunswick and Carteret are expected to grow much faster than the state as a whole. New Hanover's growth rate is expected to slightly exceed that of the state (OSBM, 1988).

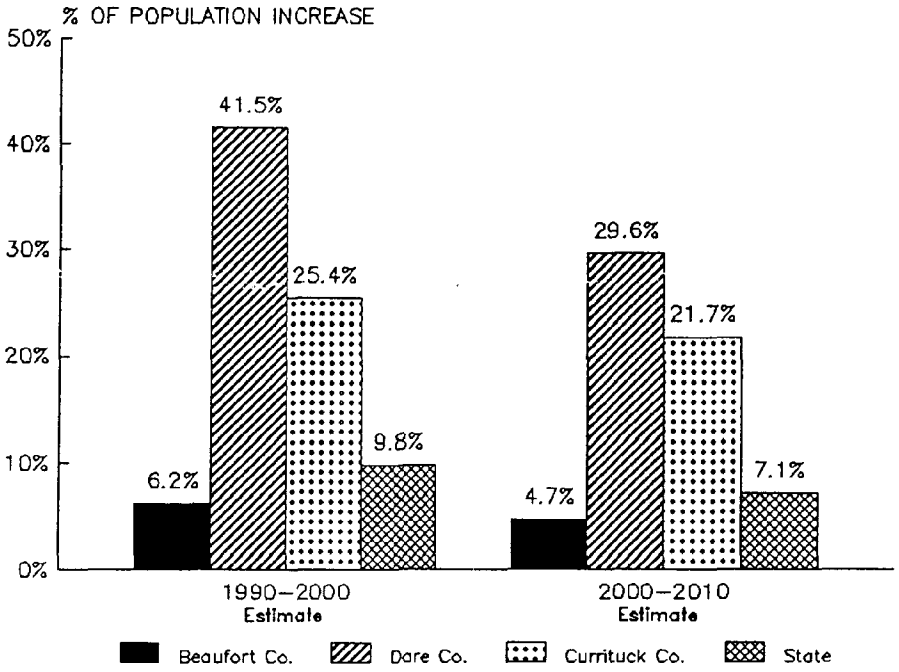


Figure 17. Projected permanent population growth rates for Beaufort, Currituck, and Dare Counties. Estimated rates are for permanent populations based on current trends. The state's projected population growth rate is used for a control. Data are presented for 1990 to 2000, and 2000 to 2010 (Source: Office of State Budget and Management, 1988).

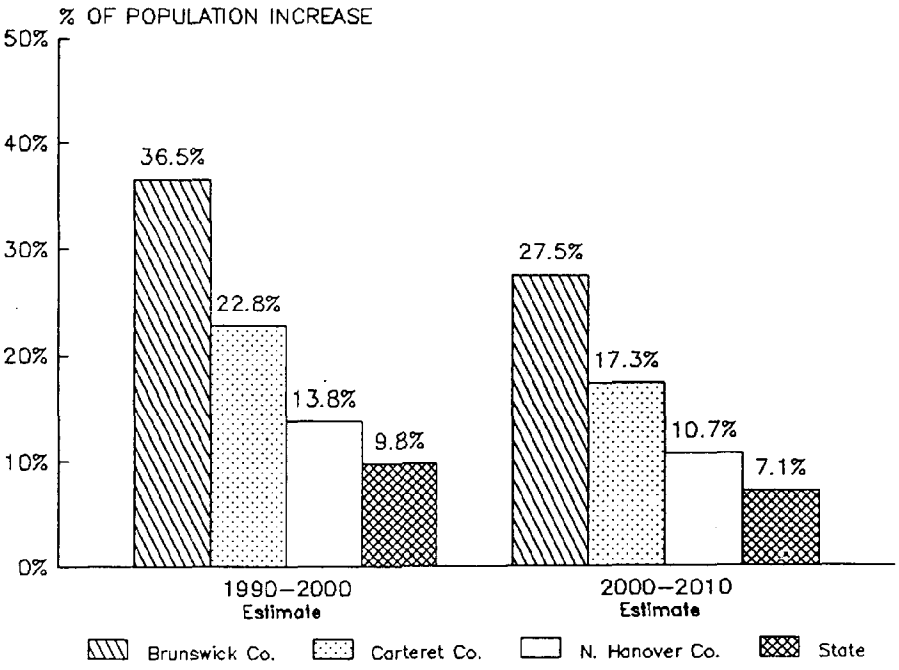


Figure 18. Projected permanent population growth rates for Brunswick, Carteret, and New Hanover Counties. Estimated rates are for permanent populations based on current trends. The state's projected population growth rate is used for a control. Data are presented for 1990 to 2000, and 2000 to 2010 (Source: Office of State Budget and Management, 1988).

Seasonal Population Data

For seasonally attractive localities, particularly those with high tourist visitation, population analysis and estimation is not as simple. Summer resort communities experience wide fluctuations of population according to the season. These seasonal increases can far exceed any of the population growth rates previously discussed. For example, in the 1970s, peak seasonal population increases (i.e., above permanent resident population) in Carteret County municipal areas averaged 121 percent (Carteret County, 1985). Seasonal populations are comprised of three groups; year-round or permanent residents, seasonal residents, and day visitors. Seasonal estimates are often published for "peak seasonal days", or the day of highest annual visitation to resort areas (e.g. the Fourth of July). Often these data are based on the number of recreation dwellings or on traffic counts.

To demonstrate the extremes that seasonal populations can represent, seasonal population data is listed below (Table One) for some select beach communities. The percentage increase is computed using the difference between the permanent population and the number of seasonal visitors during the "peak day".

Table 1: Peak Seasonal Population 1985

Location	Permanent Pop.	"Peak" Pop.	% Increase
a) Ocean Isle Beach	372	22,560	+5960
b) Sunset Beach	189	7,536	+4090
c) Nags Head	1,653 (est.)	30,768 (est.)	+1760
d) Atlantic Beach	1,350 (est.)	18,500 (est.)	+1270
e) Kill Devil Hills	2,596	30,136	+1060
f) Wrightsville Bch.	4,046	27,994	+592
g) Kure Beach	1,081 (est.)	7,420 (est.)	+586
h) Carolina Beach	3,900 (est.)	12,500 (est.)	+220

Source:

a) Ocean Isle, 1987;
b) Sunset Beach, 1987;
c) Nags Head, 1985;
d) Atlantic Beach, 1988.
e) Kill Devil Hills, 1987;
f) Wrightsville Beach, 1986;
g) Kure Beach, 1986;
h) Carolina Beach, 1986.

The population variation experienced by these and other beach communities is phenomenal. The increases are so large that it is difficult to place these data in proper perspective. Small communites such as Sunset Beach, Ocean Isle, and Nags Head are experiencing tremendous fluctuations in annual populations.

This kind of explosive seasonal growth makes planning public facilities and services very difficult. Local governments in many coastal counties must design their facility and service capacities to meet peak seasonal demand. A statement in Dare County's LUP expressed it succinctly, "If an analogy were to be made between Dare County and a major airline company, it might be said that better than four out of every five planes are grounded and out of service for the majority of any given year" (Dare County, 1988).

Seasonal population fluctuations can create economic havoc with businesses, and poses significant problems for the small local governments found in most coastal counties (Dare County, 1988). The tremendous influx of seasonal residents represents a severe strain on the carrying capacity of the coastal area. The seasonal populations, however, represent a much needed boost for the economies of this region. This point is illustrated in the next section which addresses the travel and tourism industry.

TRAVEL AND TOURISM

More than 227,000 North Carolinians, or ten percent of North Carolina's private employment, work in businesses directly serving travelers. Other areas of the economy, retail trade for example, also owe a portion of their earnings to travel-related expenditures. "Estimates indicate that each travel dollar yields another 79 cents of spending as it moves through the economy of the state" (NC Travel Study, 1987). If we include secondary economic impacts, travel-related jobs support another 112,000 jobs statewide (NC Travel Study, 1987).

Already one of the state's larger industries, tourism is likely to grow within the next few years to become the largest, surpassing textiles, furniture, and tobacco (Barnett, 1988). Much of the growth in the tourism industry is occurring in the coastal region. Dare County, the state's leader in the tourism industry, generated $18,607 in travel revenue for each permanent resident in 1986. When one compares that figure to the state's average, $805 per resident, it is easy to understand the impact that tourism is having on the coast. Of the top 21 counties with above average per-capita tourism spending, six are found in the CAMA regulated counties (Barnett, 1988). Clearly, tourism is the coastal region's fastest growing economic segment.

Travel and tourism expenditures are presented in two groups of data. The first analysis will focus on the coastal region's share of the total travel and tourism expenditures from 1971 (pre-CAMA) to 1987. The second analysis will examine the impact of travel and tourism on selected counties. These data include tourism expenditures and the percentage of the work force employed by tourism. The Division of Travel and Tourism in the North Carolina Department of Commerce compiles and publishes an annual travel study. These reports provided the data for this discussion. In order to adjust expenditures for inflation, revenues were adjusted to 1984 dollars (1984 = 100) using the Consumer Price Index (CPI). The CPI for entertainment was judged applicable for this conversion.

Figure 19 shows the 1971 travel expenditures for North Carolina. For this year, the twenty coastal counties captured a 9.0 percent share of the total amount (NC Travel Study, 1972). By 1978, the year CAMA permitting began, that share had increased slightly (Figure 20) (NC travel Study, 1979). In 1982, tourism added $497 million to the economies of the coastal counties. This dollar amount was slightly above 15 percent of the state's total travel revenues (Figure 21) (NC Travel Study, 1983). In 1987, travel related expenditures represented a $989 million industry to coastal counties (Figure 22). In a period of 16 years, the coastal counties' share of the total travel expenditures more than doubled (NC Travel Study, 1987).

The case study counties provide insight into how this

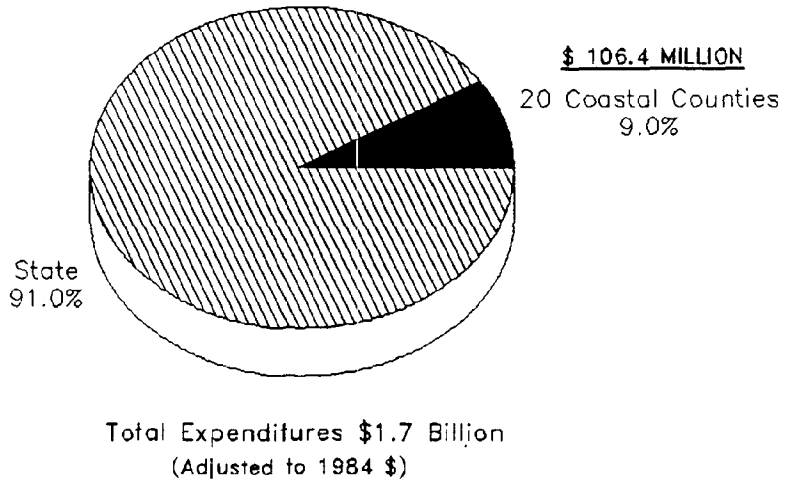


Figure 19. Total North Carolina travel and tourism expenditures for 1971. The 20 coastal counties' revenues are shown as a percentage of the total expenditures (Source: North Carolina Travel and Tourism, 1972).

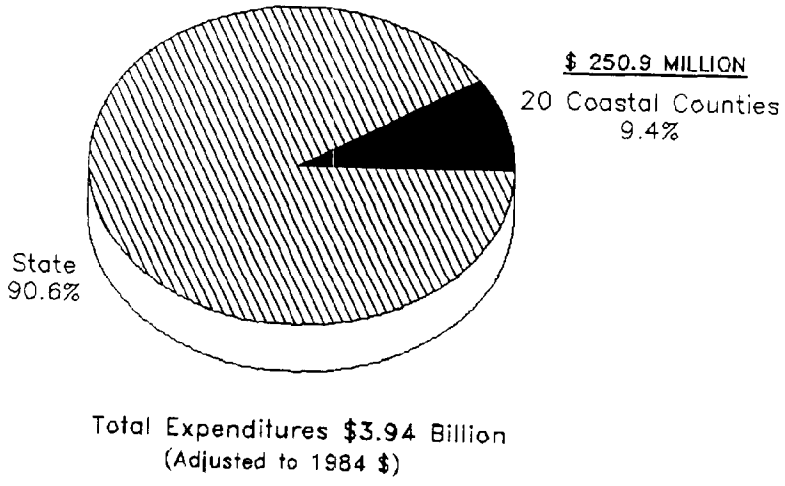
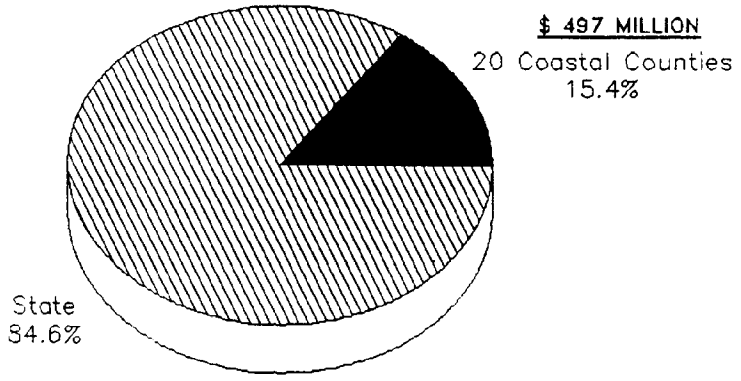
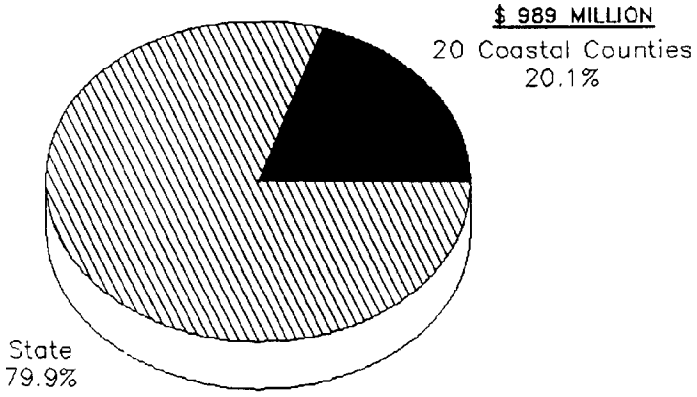


Figure 20. Total North Carolina travel and tourism expenditures for 1978. The 20 coastal counties' revenues are shown as a percentage of the total expenditures (Source: North Carolina Travel and Tourism, 1979).



Total Expenditures $3.23 Billion
(Adjusted to 1984 $)

Figure 21. Total North Carolina travel and tourism expenditures for 1982. The 20 coastal counties' revenues are shown as a percentage of the total expenditures (Source: North Carolina Travel and Tourism, 1983).



Total Expenditures $4.94 Billion
(Adjusted to 1984 $)

Figure 22. Total North Carolina travel and tourism expenditures for 1987. The 20 coastal counties' revenues are shown as a percentage of the total expenditures (Source: North Carolina Travel and Tourism, 1988).

enormous revenue can vary from county to county. Figures 23 to 28 illustrate travel expenditures for individual counties. Beaufort County experienced a fluctuating rate of revenue (Figure 23). Travel expenditures grew during the late 70s and early 80s, however, the county's 1987 revenues were half that of 1971 revenues. Generally, the inland counties' share of the tourist market is a small percentage of the coastal region's total annual amount (NC Travel Study, 1987). This is evident when one compares inland counties with ocean-front counties.

Not all ocean-front counties share in this huge economic windfall. Currituck County's travel expenditures are the lowest of the six counties studied (Figure 24). As noted, Currituck Banks has limited access and has grown at a slower rate than that of most ocean-front counties. Although increasing, tourism revenues are well below those of the other five counties. A comparison of Currituck and adjacent Dare County presents a startling contrast.

Dare County benefits more from tourism than any other county in the state. Tourism accounted for more than $347 million in revenue for the county in 1987 (Figure 25). From the period 1971 to 1987, tourism expenditures grew an amazing 2900 percent! Dare County illustrates the impact tourism can have on coastal economies. The 1987 NC Travel Study points out that to estimate the total economic benefits to an area, one must multiply the travel expenditure by a "multiplier" of $1.79 (NC Travel Study, 1987). Using this figure, the total tourism based economic benefit to Dare County for 1987 was $621 million.

New Hanover County's expenditures have grown steadily during the study period (Figure 26). The county was second to Dare in tourism revenues. Carteret and Brunswick Counties, two of the fastest growing coastal counties have also reaped tremendous benefits from travel and tourism (Figures 27 & 28). From 1982 to 1987, travel related expenditures increased almost one and one half times in Carteret County, and tripled in Brunswick County.

The majority of the 20 CAMA regulated counties are rural. In many of them, the agricultural economic base is declining (Albemarle Regional Planning Commission, 1987). Travel and tourism represent large revenues for these counties, as well as new job sources. Since 1981, The Division of Travel and Tourism has collected data relating to the percent of the total work force that is employed through these activities. These data are presented for the six case study counties.

Although only a small percent of Beaufort County's work force is employed by travel and tourism related jobs, the percentage is increasing annually (Figure 29). Currituck County's percentage fluctuates, but has remained above ten percent for the period from 1981 to 1986 (Figure 30). Dare

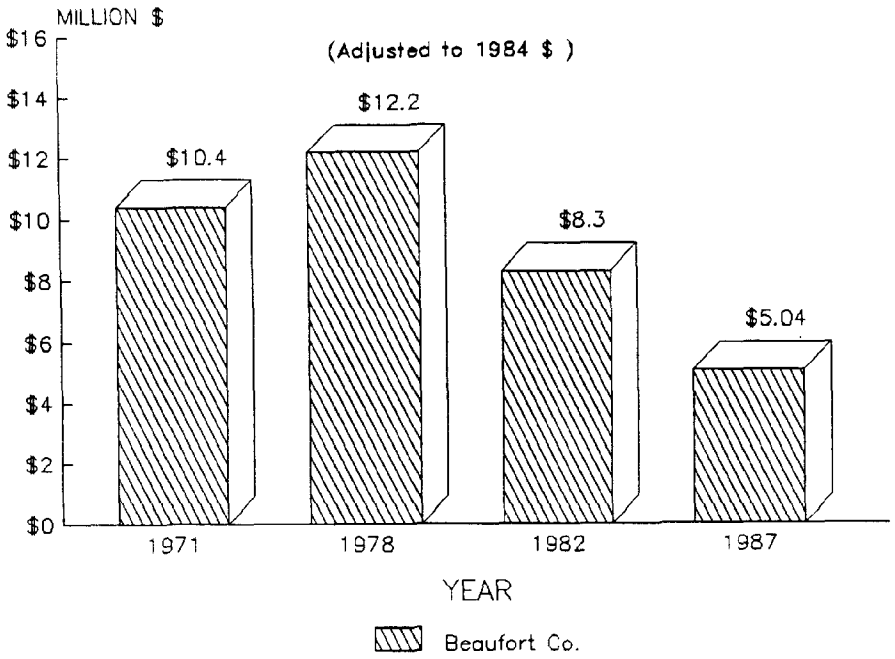


Figure 23. Total travel and tourism expenditures for Beaufort County, N.C.. Revenues are shown for the period 1971 to 1987 (Source: North Carolina Travel and Tourism).

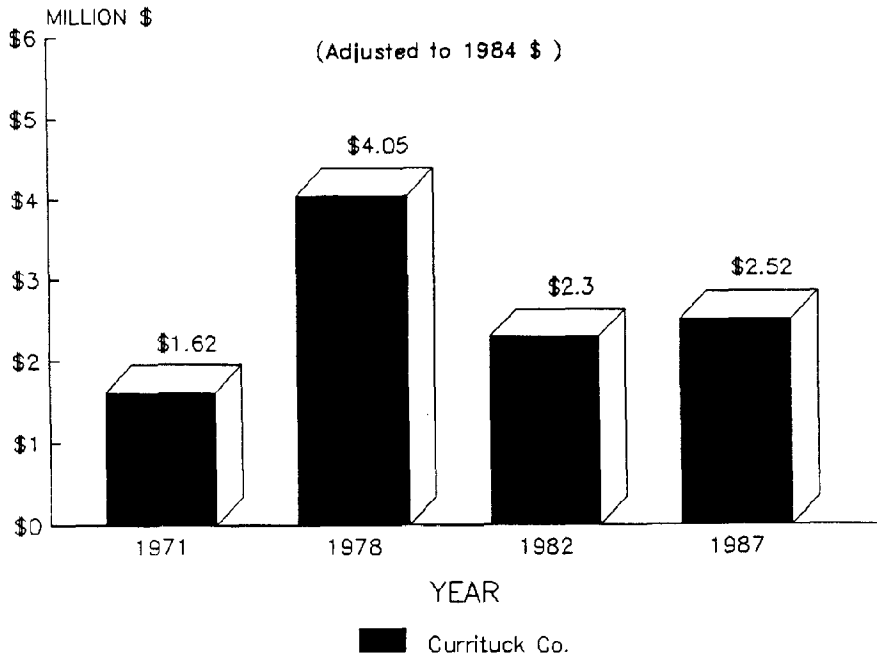


Figure 24. Total travel and tourism expenditures for Currituck, County, N.C.. Revenues are shown for the period 1971 to 1987 (Source: North Carolina Travel and Tourism).

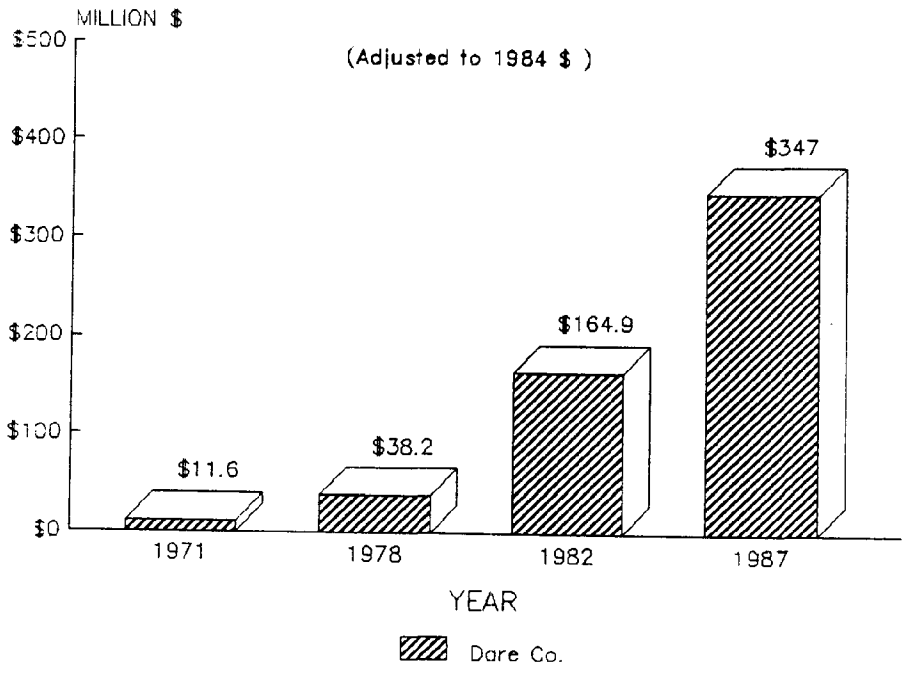


Figure 25. Total travel and tourism revenues for Dare County, N.C.. Revenues are shown for the period 1971 to 1987 (Source: North Carolina Travel and Tourism).

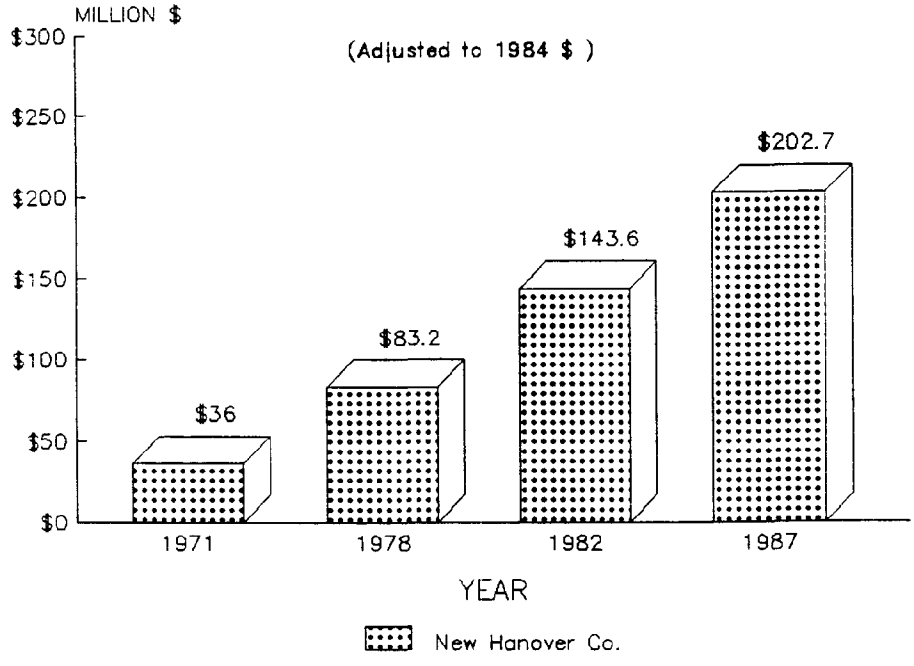


Figure 26. Total travel and tourism revenues for New Hanover County, N.C.. Revenues are shown for the period 1971 to 1987 (Source: North Carolina Travel and Tourism).

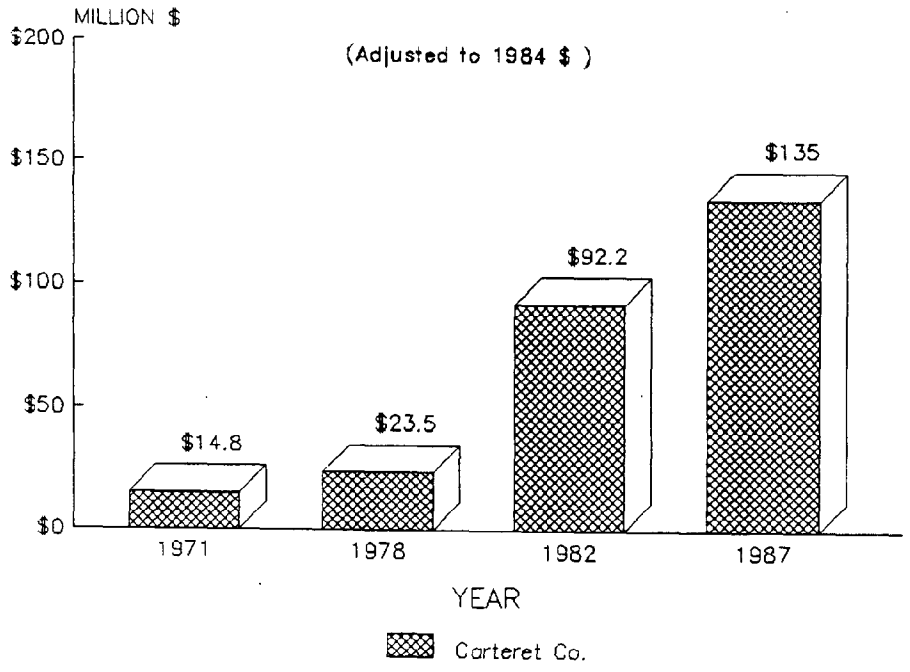


Figure 27. Total travel and tourism revenues for Carteret County, N.C.. Revenues are shown for the period 1971 to 1987 (Source: North Carolina Travel and Tourism).

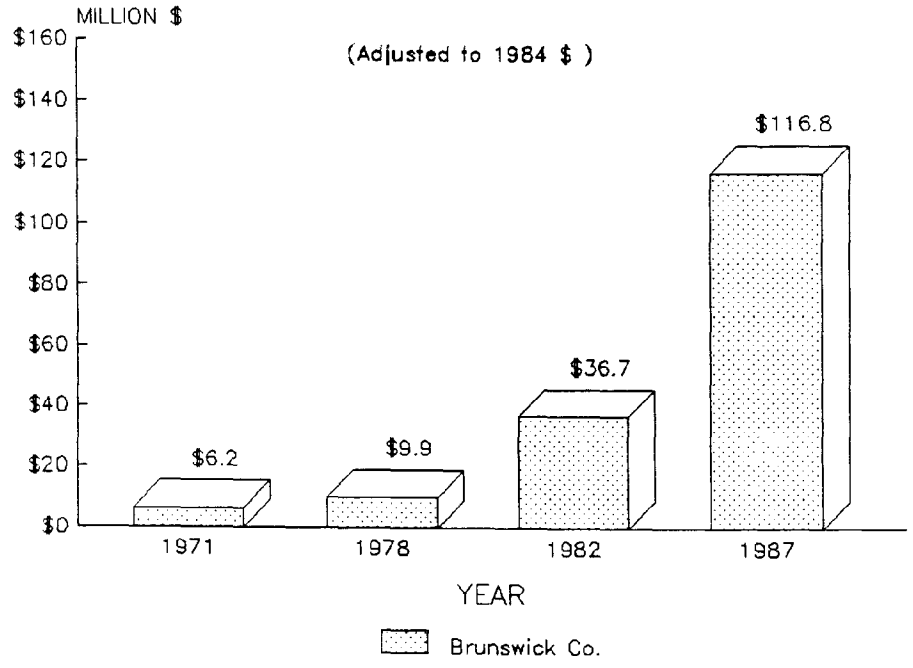


Figure 28. Total travel and tourism revenues for Brunswick County, N.C.. Revenues are shown for the period 1971 to 1987 (Source: North Carolina Travel and Tourism).

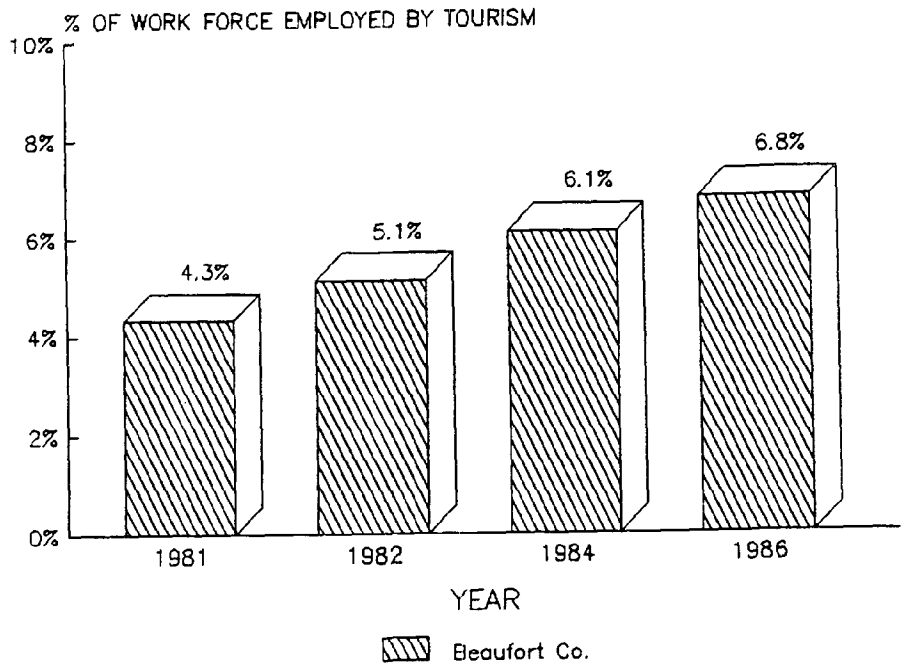


Figure 29. Percentage of Beaufort County's work force employed through tourism activities. Employment figures are shown from 1981 to 1986 (Source: North Carolina Travel and Tourism).

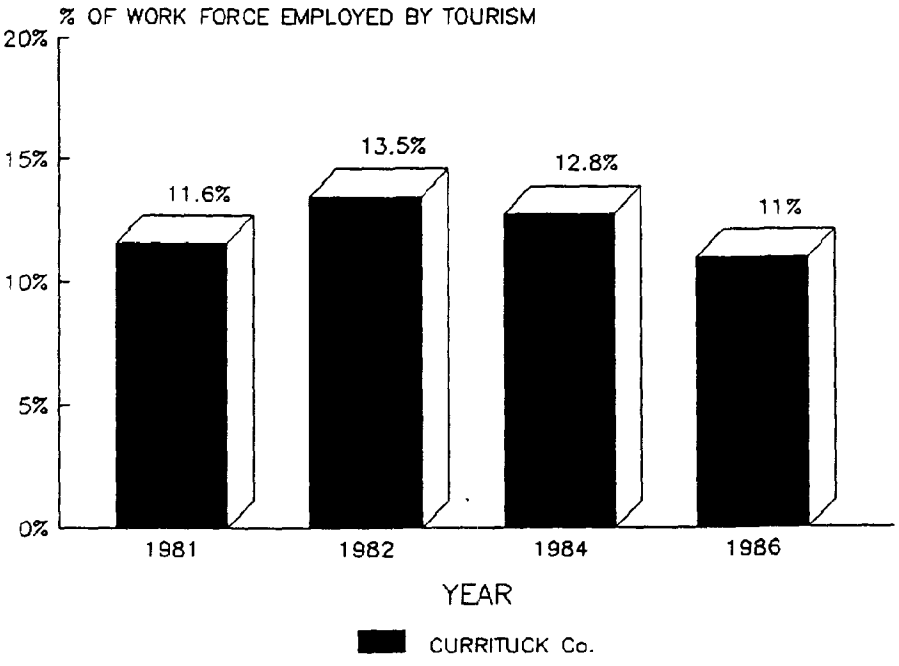


Figure 30. Percentage of Currituck County's work force employed through tourism activities. Employment figures are shown from 1981 to 1986 (Source: North Carolina Travel and Tourism).

County is a clear example of the effects tourism can have on a county's work force. In the period from 1981-1986, almost 40 percent of the jobs in the county were directly based on travel and tourism (Figure 31).

The Division of Travel and Tourism has computed a "job multiplier" to determine the indirect number of jobs that "spin-off" from travel expenditures: 1.66 times the number of primary jobs (NC Travel Study, 1987). Therefore, in Dare County the actual percentage of the total work force employed by tourism is close to 50 percent (NC Travel Study, 1987). Carteret County ranks second in this category. For the same study period, between 18 and 19 percent of the county's work force was employed through tourism (Figure 32). New Hanover and Brunswick Counties' employment figures are similar (Figures 33 & 34). Since 1980, both counties have experienced an annual increase in the number of tourism based jobs.

Tourism is the fastest growing industry in North Carolina, and the coastal area is the site of much of this growth (Barnett, 1988). As the number of seasonal visitors increase, the need for new housing and facilities also increases. Many of these facilities are constructed on ocean-front or sound-side sites regulated by CAMA. The following section examines residential building permit data.

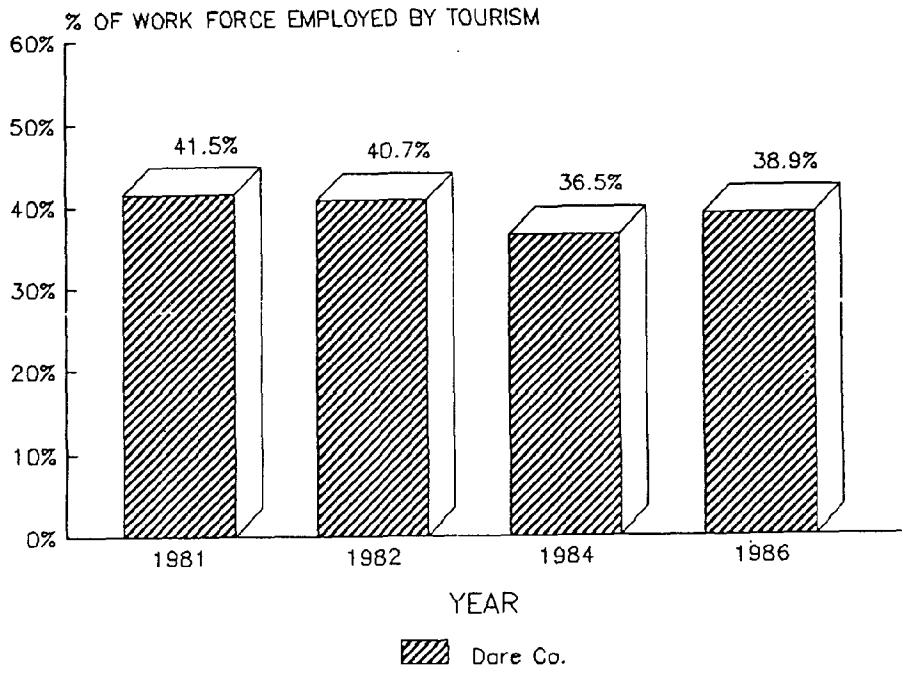


Figure 31. Percentage of Dare County's work force employed through tourism activities. Employment figures are shown from 1981 to 1986 (Source: North Carolina Travel and Tourism).

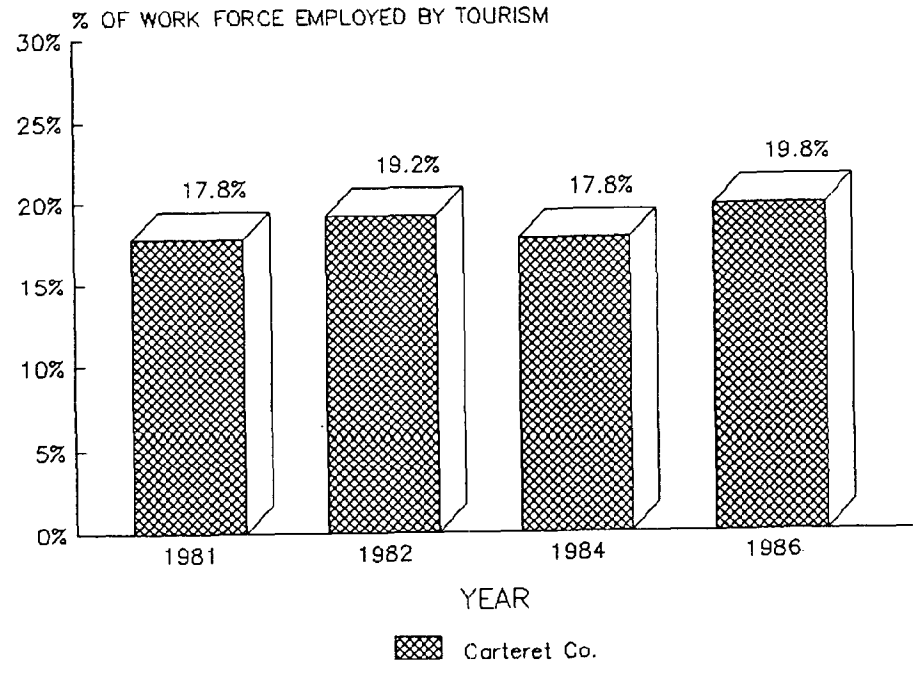


Figure 32. Percentage of Carteret County's work force employed through tourism activities. Employment figures are shown from 1981 to 1986 (Source: North Carolina Travel and Tourism).

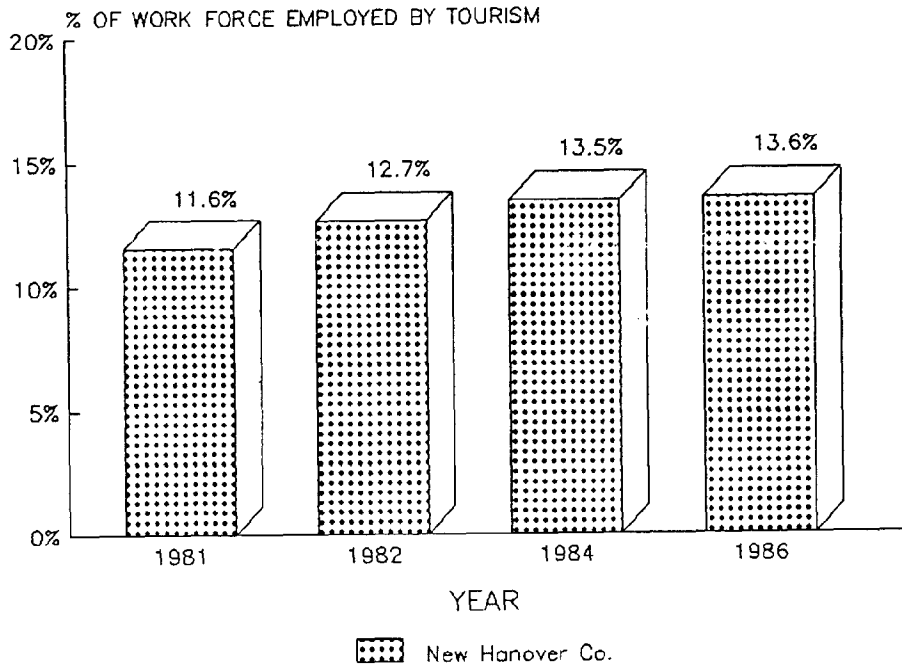


Figure 33. Percentage of New Hanover County's work force employed through tourism activities. Employment figures are shown from 1981 to 1986 (Source: North Carolina Travel and Tourism).

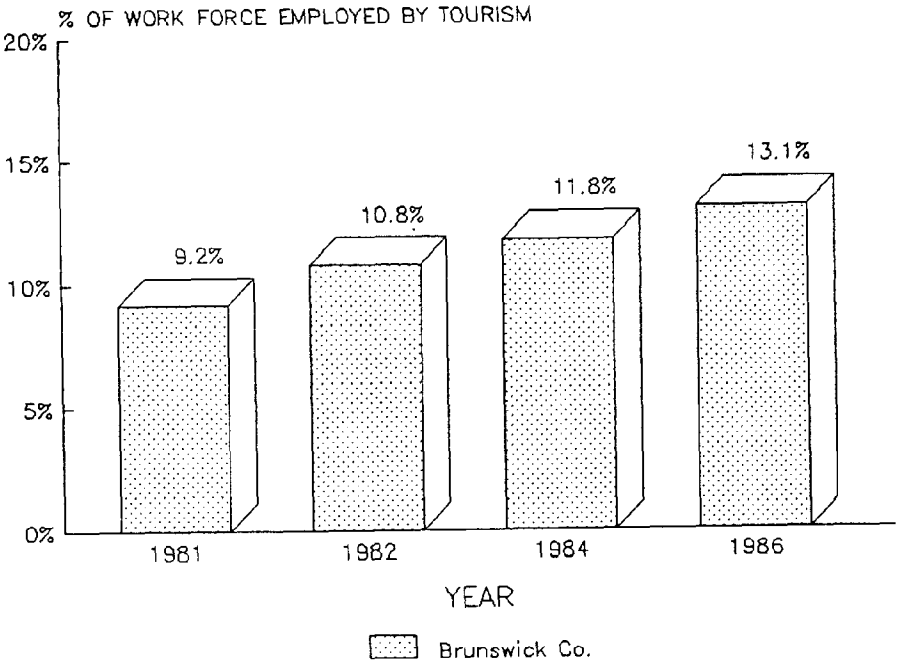


Figure 34. Percentage of Brunswick County's work force employed through tourism activities. Employment figures are shown from 1981 to 1986 (Source: North Carolina Travel and Tourism).

THE HOUSING INDUSTRY AND CAMA

> Housing developments have caused extensive damage in coastal zones. Housing developments constitute the primary competitor for coastal zone resources and dominate land use patterns within the coastal zone (Richardson, 1978).
>
> Development on and near estuarine shorelines in the Pamlico River and western Pamlico Sound of North Carolina poses several threats to the environmental quality of the Pamlico estuary. Shoreline development may be associated with water pollution and degradation of estuarine habitats through improper wastewater treatment, excessive or polluted storm runoff quality, and habitat destruction (Phillips, 1985).
>
> A subsidiary of the Weyerhauser Co. is seeking state approval for an 875-acre development at Chocowinity Bay on the Pamlico River. It would be one of the largest residential projects in Beaufort County (The News and Observer, 1989).
>
> Property values have doubled in Carteret County since the last revaluation in 1981 from $1.6 billion to $3 billion the tax assessor said Wednesday. The Assessor, C. Sterling Hancock, said the demand for land in the county-especially waterfront property-has caused the property values to rise since the last revaluation. `People just want into this county and when people want something, they will pay for it' (News and Observer, 1989)

This lengthy introduction is provided in hopes that it will afford the reader some insight into one of the most difficult questions that the North Carolina Coastal Management Program must deal with: how can policymakers weigh the value of economic development against that of maintaining a fragile ecosystem? As noted throughout this paper, CAMA is a controversial statute. Many developers see CAMA regulations as a barrier to economic growth, especially growth in the housing industry (Olson, 1989; Finger and Jacobs, 1982). Some conservation groups, however, feel that CAMA regulations do not go far enough, spending too much time and money on planning rather than action (McGuire, 1983; Finger and Jacobs, 1982).

The economic effects of land use controls such as those authorized by CAMA are difficult to assess. Proper analysis is often impeded by the lack of methodology and practical restraints. It is often not possible to separate the impacts of land use controls from the effects of other associated variables, including housing demand, interest rate changes, and concurrent environmental legislation.

Despite these problems, the intent of this study was to determine if CAMA has had a negative effect on the building trades in the coastal counties. This analysis consisted of two components: 1) a questionnaire administered to coastal county planners, Local CAMA Permit Officers (LPOs), and representatives of the North Carolina Home Builders Association, to obtain their opinions regarding the effects of CAMA regulations on the housing industry; and 2) a building permit comparison between the 20 coastal counties and state-wide data. A discussion of the questionnaire follows.

The Questionnaire

Many groups are actively involved with coastal development from a regulatory and/or an economic standpoint. From those, the author selected three that he believed would present a diverse group of opinions. The first group, Local Permit Officers (LPOs) are employed by local governments, often serving dual roles as building inspectors and LPOs. The LPOs, trained by DCM staff members, issue both general and minor CAMA development permits. The questionnaire was administered to 12 LPOs selected from throughout the 20 counties. Those surveyed had served as LPOs from eight months to over ten years.

The second group that was surveyed were county planners. The planners were selected because of their daily involvement with county and region-wide construction activity. The length of service for the planners ranged from nine months to ten years. The majority of the 20 counties regulated by CAMA do not have full-time planners, however, the questionnaire was administered to the eight full-time planners. Finally, the questionnaire was administered to the five coastal representatives of the North Carolina Home Builders Association (HBA). The author believed that they could provide insight into CAMA from a non-regulatory viewpoint.

The questionnaire, was designed so that the same questions were appropriate for each group. A self-addressed stamped return envelope and a cover letter, explaining the nature of the project, were enclosed with each questionnaire. The completed forms were unsigned so that the participants would remain anonymous, however, it was possible to identify the responses by groups (i.e. planners, builders, etc.). Each response was tallied separately and the participants were not required to answer all the questions for a response to be counted.

Some of the questions were general in nature, for example: "In your opinion, is CAMA supported by the majority of citizens in your county or area"? and "Are you familiar with the permitting process required by the Coastal Area Management Act (CAMA)"? The majority of the questions were directed at obtaining the participants' opinions regarding the effects of CAMA on the housing industry. Since these responses were most significant to this analysis, only these questions will be

discussed in detail, however, a complete questionnaire is presented for the reader's information in Appendix One.

Results

The survey was not designed to be analyzed statistically, but rather to gather responses from a varied audience regarding the impacts of CAMA on the building trades. Because the survey population was so small, it is difficult to assign any far reaching conclusions. The responses, or lack of responses in some cases, did hint at the complex nature of the relationship between land use planning and economic growth.

The response to the questionnaire varied from group to group. Fifty-eight percent of the LPOs returned the questionnaire, and 62.5 percent of the county planners responded. There was no response to the questionnaire from the representatives of the Home Builders Association. The author does attempt to assign any significance into this group's response, or lack of response. The HBA's failure to complete the survey would seem to indicate either: 1) lack of interest in the project, or 2) CAMA regulations are controversial within this group, or misunderstood by the recipients of the questionnaire.

The results from the questionnaire are shown on the following pages in Table Two. The answers are presented as a percentage of the total number of respondents. Only the answers that pertain to CAMA's effect on the building trades are shown.

Table 2: Responses to the CAMA/Building Trades Questionnaire

1) In your opinion, has CAMA caused any economic hardships on the building trades in your area?

Planners (N = 5)

YES	No
0%	100%

Local Permit Officers (N = 7)

YES	NO
0%	100%

Home Builders Association
No Response

2) In your opinion, has CAMA had a positive or negative effect on the overall economic growth in your area?

Planners (N = 5)

POSITIVE	NEGATIVE	NO EFFECT
60%	20%	20%

Local Permit Officers (N = 7)

POSITIVE	NEGATIVE	NO EFFECTS
17%	0%	83%

Home Builders Association
No Response

3) In your opinion, has CAMA had a positive or negative effect on housing construction in your area?

Planners (N = 5)

POSITIVE	NEGATIVE	NO EFFECT
60%	0%	40%

Local Permit Officers (N = 7)

POSITIVE	NEGATIVE	NO EFFECT
50%	0%	50%

Home Builders Association
No response

Table 2 Responses to the CAMA/Building trades Questionnaire

4) Have CAMA regulations steered coastal development from environmentally fragile areas, such as estuarine shorelines or ocean-front areas, to locations suited for development but not covered by CAMA regulations, e.g. inland areas?

Planners (N = 5)

YES	NO
60%	40%

Local Permit Officers (N = 7)

YES	NO	NO EFFECT
29%	58%	14%

Home Builders Association
No Response

Questionnaire was administered January, 1989.

The results indicate that in the opinions of the LPOs and county planners who responded, CAMA has not caused the building trades any economic hardships (i.e., slowed building). The planners indicated that CAMA has had a positive effect on their county's overall economic growth. The LPOs, however, thought that CAMA regulations have had no effect on the growth in their region. Responding to question three, the majority of the planners indicated that CAMA has actually had a positive effect on the construction industry. Their reasons for this included: CAMA maintains water quality which attracts quality housing; CAMA's low density emphasis encourages quality housing; and setback regulations increase property values while offering more protection to environmentally sensitive areas. The responses were varied on the question of whether or not CAMA has steered development away from environmentally sensitive areas, however, the majority of the participants felt that CAMA is directing growth away from the ocean-front and estuaries.

Although the results of the questionnaire were interesting and informative, they in themselves were not useful as a quantitative indicator of the effects of CAMA regulation on the housing industry. The second component of this section will deal with housing permits, a general index of housing activities that can be quantified.

Building Permits

The long-term outlook for housing is determined primarily by demographic pressures and income growth. Housing starts in North Carolina are expected to remain above the 70,000 unit annual rate for the remainder of this decade before declining slightly in the mid 1990s (OSBM, 1987). Housing starts are used as an general economic index by federal and state governments (Scheideler, 1989). Home construction, an important industry for various reasons, employs many primary workers, as well as numerous "spin-off" jobs. For this reason the housing industry was selected as a means of determining overall economic development in the coastal region and as a method for comparing coastal growth with that of the entire state.

Two types of housing data are collected by the Bureau of the Census: housing starts, and building permits. Unfortunately, in this state, housing starts are only published for Mecklenburg County (Scheideler, 1989). Building permits for new homes, however, are compiled state-wide. The Census Bureau points out that building permits do not represent the number of units actually put into construction, and should not be directly interpreted as "housing starts" (Census Bureau, 1985).

> However, the continuing sample surveys made each month by the Census Bureau indicate that-for the nation as a whole-only two percent of the housing units authorized by permits are never constructed. The surveys also show that a major proportion of the units normally get under way during the month of permit issuance, and that most of the remainder are started within the following three months (Census Bureau, 1985).

There are limitations to these data. These include: building permits do not reflect residential construction outside areas subject to local permit requirements; some new residential construction works in permit jurisdiction escapes recording; and finally, changes in the boundaries of permit-issuing places due to annexations, new incorporations, etc., may result in some problems of comparability in the statistics over time (Census Bureau, 1985). Despite these limitations the Census Bureau concludes,

> To the extent that these limiting factors apply rather consistently over an extended period, they may not seriously impair the usefulness of building permit statistics as indicators of trends in residential construction activity (Census Bureau, 1985)

Therefore, housing permit data can be useful for indicating building trends in the coastal region. Furthermore, if this regional data is compared to state-wide data, a general index between construction activity inside and outside CAMA regulated counties can be obtained. The results of such a comparison are presented below.

Building Permit Comparison

The data were obtained for residential (single-family and multi-family) units from the U.S. Census Bureau. In accordance with the Census Bureau's definition of a unit, one building containing 50 apartments appears in these data as 50 housing units (Census Bureau, 1987). These data do not include hotels, motels, and other structures for transient accommodations. Although these structures are obviously important in tourist based economies, such as those present on the coast, collection of these data was beyond the scope of this project.

As in the previous comparison of growth parameters, the author wanted to use state-wide data for a control. The building permit data for a single county was much smaller than the state-wide data, therefore, a method was devised so that these data could be compared. Using a simple proportional equation, housing permit data was converted to "building permits per 100,000 population". The method of conversion is shown below.

$$\frac{\text{State-wide building permits (year)}}{\text{State-wide population (year)}} = \frac{\text{Permits}}{100{,}000}$$

OR

$$\frac{\text{County-wide building permits (year)}}{\text{County-wide population (year)}} = \frac{\text{Permits}}{100{,}000}$$

The building permit data were obtained for 1976 (pre-CAMA), 1978 (CAMA permitting began), 1982, and 1986. Population data was obtained from the Office of State Budget and Management's "Profile" series (OSBM, 1986). In the following discussion, the term building permits actually refers to building permits per 100,000 population. One final note regarding the data: not all counties in North Carolina report building permit data or the data was not published by the Bureau of Census. The "U.S.Census Bureau Construction Report", from which these data were obtained, publishes a relative standard error for the building permit data. The average standard error for these data is three percent, and it was assumed that this error would be distributed evenly throughout the calculations.

The first analysis was a comparison between state-wide residential building permit data and building permit data for the CAMA regulated counties. This comparison was used as an indicator of residential housing activity throughout the coastal region during the study period (Figure 35). During 1976, building permits in the 20 coastal counties were issued at a rate slightly lower than the state-wide issuance rate. In 1978, the trend was reversed; the coastal counties issuance rate was somewhat higher than the state's rate. The author believed that in anticipation of CAMA permitting regulations the issuance rate for both 1976 and 1978 would greatly exceed the state's rate; however, this was not the case. In 1982, however, the issuance of permits in the coastal counties surpassed the state's permit distribution by 37 percent. During 1986, the coastal counties' exceeded the issuance rate for the state, although the rate surplus decreased to 16 percent. One should be reminded that these data were for county-wide housing activity and CAMA regulates only three percent of the total area. This comparison, however, suggests that despite CAMA regulations, the issuance of building permits in the 20 coastal counties exceeded the state's issuance rate. As reported throughout this study, there is a wide discrepancy in trends as one makes county by county comparisons. Therefore, to further analyze housing permit data, the six selected counties were compared to the state-wide permit trends.

The permit comparisons between the state's issuance rate and the rate for individual counties presents some interesting contrasts. Building permit for Beaufort and Carteret Counties are presented in Figure 36. During 1976, Beaufort County

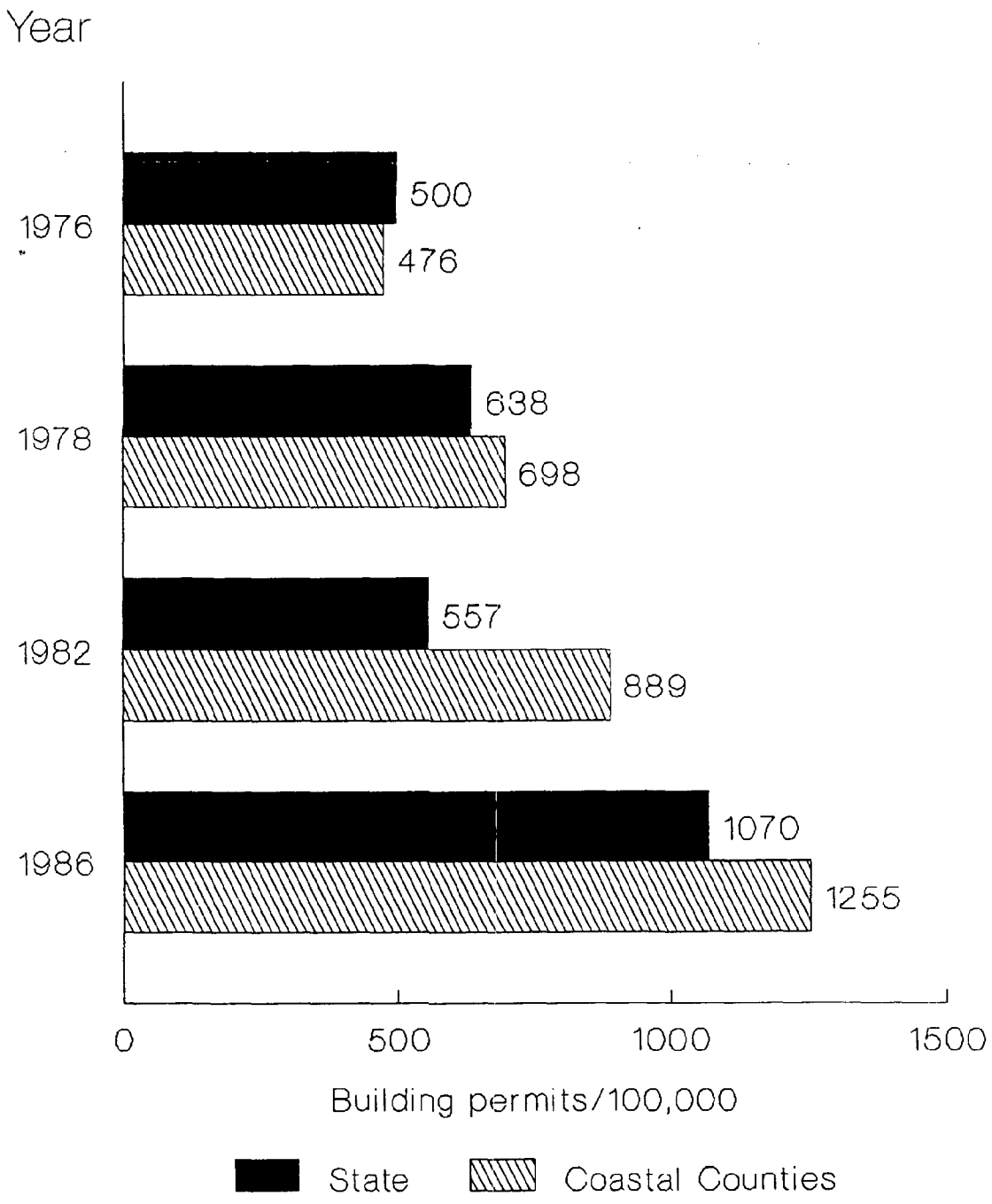


Figure 35. Comparison between state-wide building permits and CAMA regulated counties' building permits. Data are presented as building permits/100,000 population. Building permits are for residential housing, including single-family and multi-family units. Study period includes 1976, 1978, 1982, and 1986 (Source: U.S. Census Bureau (USCB), 1977; USCB, 1979; USCB, 1983; and USCB, 1987; and OSBM, 1986).

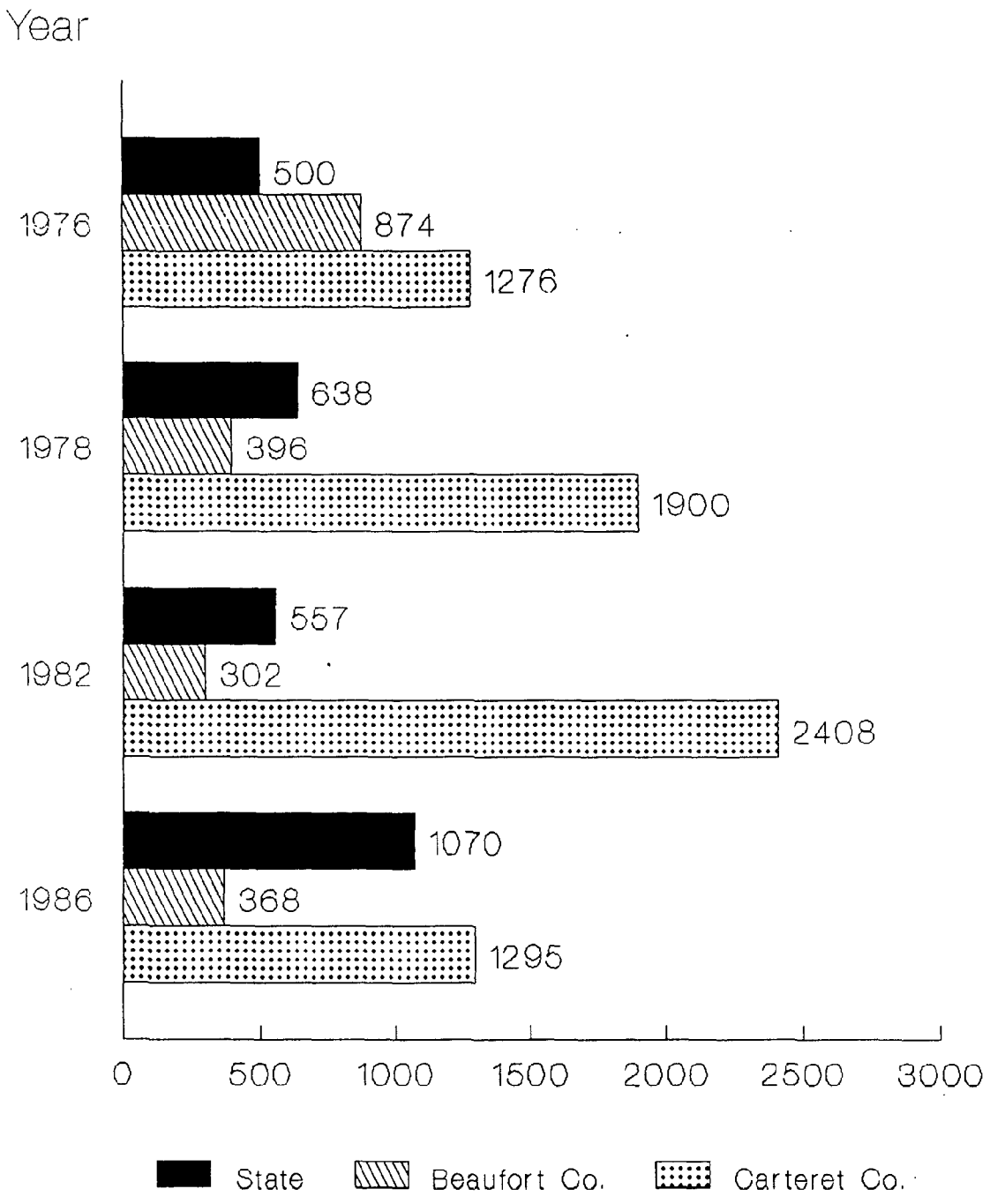


Figure 36. Comparison between state-wide building permits and Beaufort and Carteret Counties' building permits. Data are presented as building permits/100,000 population. Building permits are for residential housing, including single-family and multi-family units. Study period includes 1976, 1978, 1982, and 1986 (Source: U.S. Census Bureau (USCB), 1977; USCB, 1979; USCB, 1983; USCB, 1987; and OSBM, 1986).

exceeded the state's issuance rate by 42 percent, however, since 1978, the county's building permit issuance rate has been well below that of the state. This trend is further supported by data that were presented in earlier sections of this report. When compared to the other case study counties, Beaufort is not developing as rapidly as the ocean-front counties. Carteret County, however, presents a much different picture.

In 1976, Carteret County's building permit issuance rate was 2.5 times greater than the state's issuance rate. During 1978, this figure rose to almost three times greater than that of the state's rate. During 1982, the issuance of building permits in the county was 4.3 times greater than the state's average. That figure fell drastically in 1986; the county's issuance rate was 1.3 times greater than that of the state. As in the comparison between all 20 counties and the state-wide data, there is no way to fully assess how these rates would be modified if CAMA regulation were not in effect. The previous sections indicate that Carteret County is one of the fastest growing counties in the state. The building permit data support that fact.

The permit data for New Hanover and Brunswick Counties are shown in Figure 37. Brunswick County's permitting rate was below that of the state during 1976, however, the permitting issuance rate in 1978 rose to 2.5 times greater than that experienced state-wide. Building permit issuance was over three times that of the state during 1982. In 1986, the county's building activity slowed, although the permitting rate was greater than that of the state. Brunswick County's building permit trends, in combination with the county's other growth parameters, suggests that Brunswick County will continue to grow at a rate greater than state-wide mean. New Hanover County's permitting rates surpassed the state's average during all of the study periods, however, the county did not exhibit permit issuance rates as large as some of the other case study counties.

Figure 38 shows permitting activity for Currituck and Dare counties. Dare County, the fastest growing county in the state, showed an interesting permit trend. In 1976, before CAMA permitting began, building inspectors in the county issued a total of 3423 residential building permits. This represented an issuance rate of almost seven times the state's rate during the same period. During 1978, the year CAMA permitting began, permit issuance decreased, but it still was over four times greater than the state's average. It would be difficult to pinpoint the reasons for this decline, although CAMA permitting requirements may explain a segment of it. One further explanation might be that during this period much of the building activity was connected with hotel and motel construction, a fact that is not shown by these data. Residential housing permitting remained constant during 1982 and

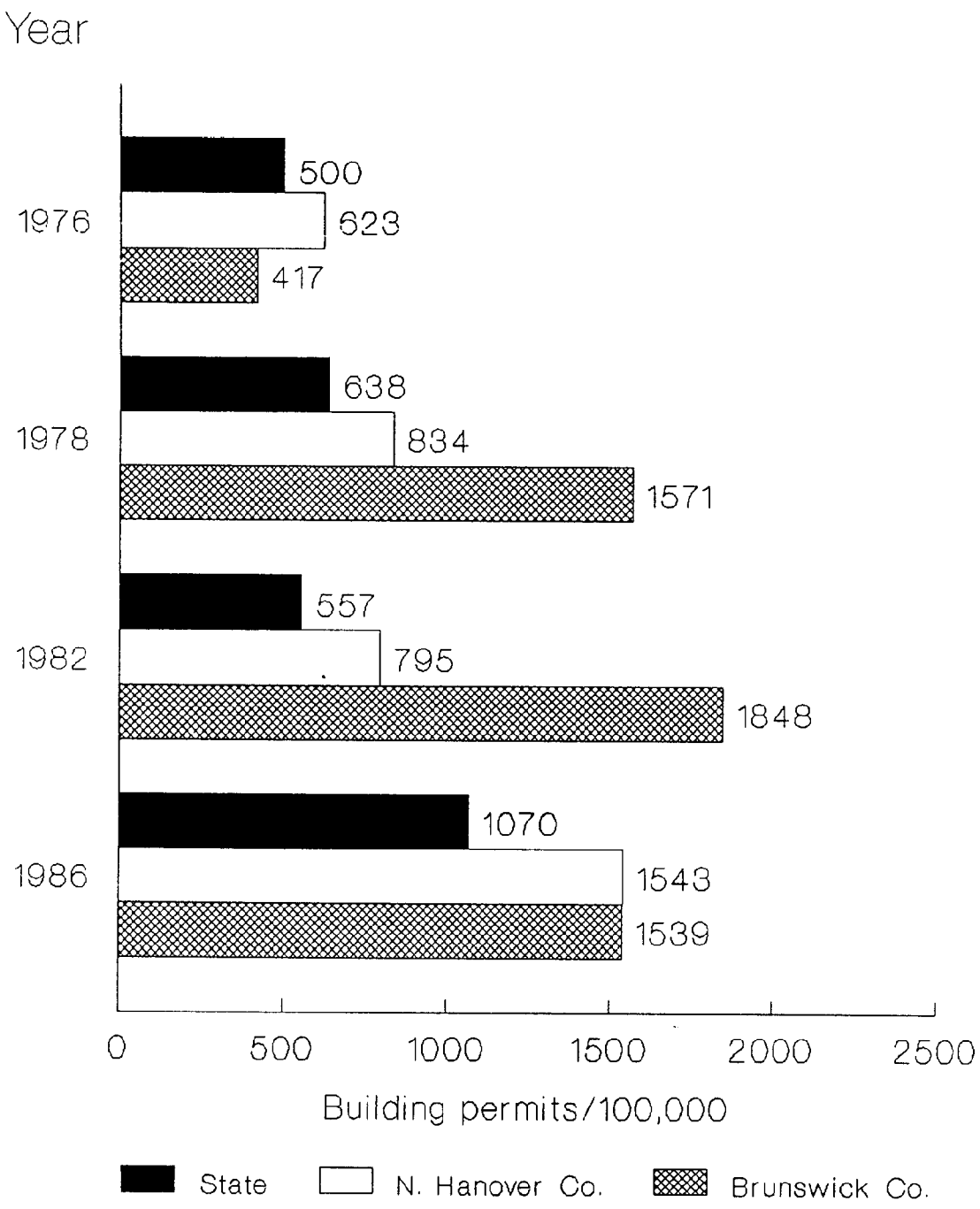


Figure 37. Comparison between state-wide building permits and Brunswick and New Hanover Counties' building permits. Data are presented as building permits/100,000 population. Building permits are for residential housing, including single-family and multi-family units. Study period includes 1976, 1978, 1982, and 1986 (Source: U.S. Census Bureau (USCB), 1977; USCB, 1979; USCB, 1983; USCB, 1987; and OSBM, 1986).

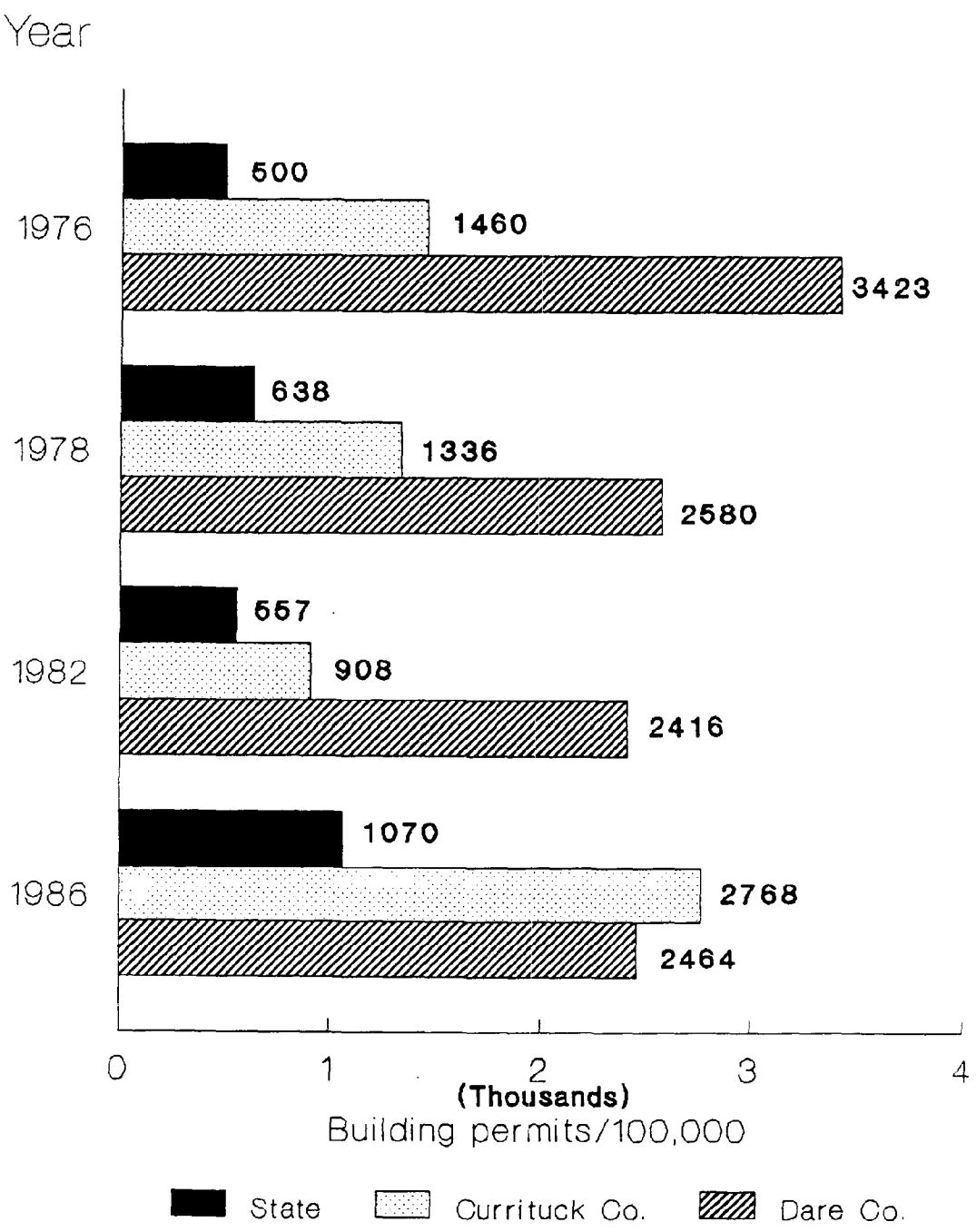


Figure 38. Comparison between state-wide building permits and Currituck and Dare Counties' building permits. Data are presented as building permits/100,000 population. Building permits are for residential housing, including single-family and multi-family units. Study period includes 1976, 1978, 1982, and 1986 (Source: U.S. Census Bureau (USCB), 1977; USCB, 1979; USCB, 1983; USCB, 1987; and OSBM, 1986).

1986, and the county's issuance rate was slightly greater than two times that of the other counties in North Carolina. Based on these data, it would appear that Dare County's housing industry has not experienced any negative effects from CAMA regulations.

As noted in an earlier section, Currituck County has developed at a slower rate than many of the other ocean-front counties. Currently, however, it is one of the fastest growing counties in the state, and the building permit data seems to support this fact. During 1976 and 1978, the county issued building permits at a rate of 2.5 times greater than the state-wide issuance rate. In 1982, the total number of building permits fell to a rate slightly higher than the state's. There was an overall decline in the state during the same period, however, the decline was not as evident in the other selected counties. In 1986, Currituck County issued building permits at a greater rate than any of the other five counties, including Dare, and at rate greater than 2.5 times that of the state. These data, when considered with other growth indicators, seem to suggest that Currituck County may continue to grow at a pace greater than many of the other coastal counties.

Conclusions

Neither the questionnaire nor the building permit comparison was designed to to be statistically analyzed. For this reason, the results of these analyses are not conclusive. When one considers both components of this exercise together, the results, however, do point toward the same conclusion. CAMA regulations have not slowed housing construction in the coastal areas.

The survey participants are actively involved in the construction industry in their areas, and the building permit analysis generally supported their observations regarding the effects of CAMA on the building trades. The author regrets that the Home Builders Association chose not to participate in the survey. The questionnaire was a forum, albeit a small one, which enabled all the groups to express their opinions about CAMA, positive or negative. The majority of the planners and LPOs who responded thought CAMA has had little or no discernible effect on the building industry in their area.

The Census Bureau and the State of North Carolina collect and analyze building permit data to estimate the general status of the building trades. There are many complex variables that affect construction, and building permits are only one indicator of building activity. The building permit comparison, however, when combined with the other indicators of growth presented in previous sections, does seem to indicate that the housing industry in the 20 coastal counties has not been adversely affected by the CAMA permitting system. The issuance of building permits in some of the coastal counties was two to

three times greater than that of the state as a whole during the same period. The reader is also reminded that these data did not include hotel or motel construction activity. Based on the travel expenditures presented earlier, one must assume that many new motels and hotels are being constructed to accommodate this market. Therefore, the author contends that the building permit data presented here are actually understated.

It is hoped this analysis will serve as the foundation for further analysis regarding the economic consequences of CAMA regulations.

MANAGEMENT RECOMMENDATIONS

During this study, I have taken great care to collect and present these data in an objective manner. I began this project with little background and with no preconceived ideas about coastal development. I think that I have presented an accurate description of the growth that has occurred in North Carolina's coastal region during the past 15 years. In the final section I present my personal opinions regarding CAMA and coastal development in North Carolina. I emphasize that these opinions are my own, and in no way are they intended to represent the policies or opinions of any agency or other persons.

Prior to May 1988, I was unfamiliar with the Coastal Area Management Act (CAMA). The only previous experience I had with the North Carolina coast was an occasional trip to the beach. During the past year, I've had the pleasure of working on two projects involving the coastal area: this project, and a project examining wastewater disposal problems and alternatives for Carteret County. During the course of my studies, I developed a deep respect for the coast and its citizens. I also developed an understanding of the complex nature of coastal resource planning and management, specifically, the difficulty of balancing human needs and environmental limitations

This past year was interesting, frustrating, challenging, stimulating, and rewarding. I've dissected population data, travel and tourism data, building permits, CAMA permits, AECs, LUPs, the CRAC, and the CRC. I've spoken with mayors, planners, county commissioners, developers, retirees, wastewater treatment plant operators, fishermen, county managers, tourists, bartenders, marine scientists, children, environmentalists, and surfers. All of these people had two things in common: they loved the coast, and they were worried about how things were changing. To some, change meant shellfish bed closings and overflowing septic tanks. To others, change meant increased regulations and permits. I believe these experiences and exchanges of ideas provided me with some ideas for management recommendations for North Carolina's coast. Not directed at any specific group, they are suggestions shared with the reader in hopes of stimulating some action or some response.

I <u>The CAMA land use plans (LUP) should incorporate a carrying capacity analysis into the planning process.</u> Many of coastal areas are reaching the limits of the ecosystem's ability to supply water, accommodate wastewater discharge, treat septic tank outflow, and store solid waste. A carrying capacity analysis for each county, similar to the study completed in Dare County, should form the foundation of the new LUPs. These fragile systems have limitations, and these limitations must be included in the planning process. If the LUP process is

to remain a useful tool for resource protection and management, these plans must include carrying capacity data.

II **A regional conference on waste management in coastal areas should be organized by the Department of Natural Resources and Community Development; including the Division of Environmental Management, the Division of Coastal Management, and the Coastal Resources Commission.**
The management of waste, both liquid and solid, is the most serious problem facing the coastal region. Many of the ocean-front communities are experiencing water quality problems because of the overloading of wastewater treatment plants and failing septic tanks. In some coastal counties, solid waste disposal facilities are rapidly filling up; some sites will close during the 1990s. As noted in the population section, peak seasonal populations can exceed permanent populations by as much as ten times. These seasonal populations overload existing treatment systems, and produce tremendous amounts of solid waste. Waste disposal should be examined from a regional viewpoint rather than by a single county plan. I believe that a group of counties could cooperate to build a regional waste disposal system large enough to handle seasonal loads, but economically feasible enough to serve permanent populations. Almost all of the coastal counties are connected by adjacent water bodies. Therefore, one county's water quality problem is really a regional water quality problem. The state must provide technical assistance to coastal counties now experiencing water quality problems. Many of the water quality problems in the coastal area begin in the inland counties.

III **A study should be conducted to determine the positive effects of CAMA regulations.**
This study indicates that CAMA regulations have had little effect on coastal growth and development. In my opinion, much of the criticisms directed at CAMA's supposed economic effects are unfounded. Morever, I suspect that CAMA has had a positive rather than a negative economic effect on the coastal area. The travel and tourism industry is a good example. Tourism is based on the amenities regulated by CAMA. One of the major reasons people visit the coast is to experience the ocean-front beaches and the estuaries. Therefore, CAMA regulations are responsible for protecting the basis of an industry that grossed over $1.14 billion in 1987. Property values have increased drastically during the past 15 years. Some planners expressed the belief that these increases are directly due to CAMA regulations. Further research is needed to evaluate the true economic benefits of CAMA. A study, similar to this one, might uncover data to support this theory. Finally, the public must be educated

concerning the continuing economic value of CAMA regulations and coastal zone management in general. There is a growing interest in the protection of coastal resources. Educational seminars should be conducted in inland regions as well as on the coast. The management of North Carolina's coastal resources is important to all of its citizens.

The men and women who designed and wrote the Coastal Area Management Act were true visionaries. They were able to imagine North Carolina's coast 15 years into the future. What they imagined has come to pass, perhaps at a rate even beyond what they envisioned. The next test for CAMA will be the ensuing 15 years. I would hope that someone will conduct a similar study in the future and conclude that the coast of North Carolina is a place where environmental ethics and human needs have coexisted in harmony.

Appendix 1. CAMA/Coastal Development Questionnaire.

QUESTIONNAIRE

1) How long have you been employed as a Local Permit Officer for your county?

2) In your opinion, has CAMA had a positive or negative effect on housing construction in your area?

If positive, could you please list an example of one positive effect.

If negative, could you please list an example of one negative effect.

3) In your opinion, is CAMA supported by the majority of citizens in your county?

4) In your opinion, has CAMA caused any economic hardships on the building trades in your area?

If yes, could you list an example of one such hardship?

5) Have CAMA regulations steered coastal development from environmentally fragile areas, such as estuarine shorelines or oceanfront areas, to locations suited for development but not covered by CAMA regulations, e.g.inland areas?

6) In your opinion, has CAMA had a positive or negative effect on the overall economic growth in your area?

If positive, could you list an example of a positive effect.

If negative, could you list an example of a negative effect

7) Have you noted an increased awareness (e.g. more interest) toward planning and growth management in your area?

If yes, why?

8) Any comments?

THANK YOU

QUESTIONNAIRE

1) How long have you been employed as a planner for your county?

2) Are you familiar with the permitting process required by the Coastal Area Management Act (CAMA)?

3) In your opinion, has CAMA had a positive or negative effect on housing construction in your area?

If positive, could you please list an example of one positive effect.

If negative, could you please list an example of one negative effect.

4) In your opinion, is CAMA supported by the majority of citizens in your county?

5) In your opinion, has CAMA caused any economic hardships on the building trades in your area?

If yes, could you list an example of one such hardship?

6) Have CAMA regulations steered coastal development from environmentally fragile areas, such as estuarine shorelines or oceanfront areas, to locations suited for development but not covered by CAMA regulations, e.g.inland areas?

7) In your opinion, has CAMA had a positive or negative effect on the overall economic growth in your area?

If positive, could you list an example of a positive effect.

If negative, could you list an example of a negative effect

8) In your opinion, have CAMA regulations made your planning job easier, or more complicated?

Easier, why?

More complicated, why?

9) Have you noted an increased awareness (e.g. more interest) toward planning and growth management in your area?

If yes, why?

10) Any comments?

THANK YOU

LITERATURE CITED

Albemarle Regional Planning and Development Commission. 1987. The Albemarle Regional Planning and Development Commission's 1987 Overall Economic Development Plan Update. Planning Region R.

Armingeon, N. A., M. K. Gausling, J. D. Hebert, M. J. Mahon, J. E. Nowell, J. P. Ple, and A. M. Romano. 1989. Wastewater disposal in Carteret County: public opinion and alternatives. Duke University, Durham, NC. 65 pp.

Atlantic Beach. 1988. Land Use Plan Update: Town of Atlantic Beach, North Carolina. 87 pp.

Bellis, V., M. P. O'Conner, and S. R. Riggs. 1975. Estuarine shoreline erosion in the Albemarle-Pamlico region of North Carolina. UNC Sea Grant publication SG-75-29. 12 pp.

Barnett, J. 1988, May 22. "Tourism: N.C.'s fast-rising industry". The News and Observer [Raleigh, NC]. p. 1-2 I.

Brunswick County. 1987. Brunswick County Land Use Plan and Policies for Growth and Development. 154 pp.

Carolina Beach. 1986. Blueprint for the Future: Town of Carolina Beach Land Use Plan. 199 pp.

Carteret County. 1985. Carteret County Land Use Plan. 209 pp.

Copeland, B. J., R. G. Hodson, and S. R. Riggs. 1984. The ecology of the Pamlico River, North Carolina: An estuarine profile. United States Fish and Wildlife Service FWS/OBS-82/06. 83 pp.

Currituck County. 1986. Currituck County Land Use Plan. 109 pp.

Dare County. 1988. Dare County Land Use Plan and Policies for Growth and Development. 136 pp.

Division of Coastal Management. 1988. Protecting coastal resources through the CAMA permit process. North Carolina Department of Natural Resources and Community Development, Raleigh, NC. 84 pp.

Finger, B. and B. Jacobs. 1982. Coastal Management. NCINSIGHT. 5(1): 2-13.

Heath, M. S. and A. C. Mosley. 1980. The Coastal Area Management Act: a progress report. Popular Government 45(4): 1-6.

Kill Devil Hills. 1987. Town of Kill Devil Hills Land Use Plan. 115 pp.

Kure Beach. 1986. Land Use Plan Update-Kure Beach, NC. 50 pp.

Liner, C. D. 1980. The impact of state regulation of coastal regulation in North Carolina. Institute of Government. The University of North Carolina at Chapel Hill. 120 pp.

Mather, T. 1988, September 18. "Pollution fouling state's coastal waters". The News and Observer [Raleigh, NC]. p. 10A.

McGuire, K. 1983, October 30. "Coastal program faces stormy seas". Sunday-Star News [Wilmington, NC]. pp. 1A, 9A, and 10A.

Miller, J. M., and P. Rublee. 1981. Ecological considerations for highways in coastal wetlands (Part II). North Carolina Department of Transportation, Division of Highways, Raleigh, NC. 154 pp.

Nags Head. 1985. Town of Nags Head, North Carolina. Land Use Plan Update. 103 pp.

News and Observer. 1988, December 29. "Property values in Carteret double from '81 to $3 billion". The News and Observer [Raleigh, NC]. p. 12C.

News and Observer. 1989, April 4. "$40 million project planned on south shore of Pamlico". The News and Observer [Raleigh, NC]. p. 5B.

North Carolina General Statute 113-102 (b).

North Carolina Travel Study. 1972. Division of Travel and Tourism, Department of Commerce, Raleigh, NC.

North Carolina Travel Study. 1979. Division of Travel and Tourism, Department of Commerce, Raleigh, NC.

North Carolina Travel Study. 1983. Division of Travel and Tourism, Department of Commerce, Raleigh, NC.

North Carolina Travel Study (Technical Report). 1987. Division of Travel and Tourism, Department of Commerce, Raleigh, NC. 53 pp.

Ocean Isle. 1987. Ocean Isle Beach, North Carolina CAMA Land Use. 70 pp.

Office of State Budget and Management. 1986. Profile, North Carolina Counties. Seventh Edition. Management and Information Services. Raleigh, NC. 300 pp.

Office of State Budget and Management. 1987. North Carolina long-term economic-demographic projections. Management and Information Services. Raleigh, NC. 30 pp.

Office of State Budget and Management. 1988. North Carolina population projections: 1988-2010. Management and Information Services. Raleigh, NC. 31 pp.

Olson, J. 1989, April 2. "Rocky beginning didn't kill coastal management plan". Sunday Star-News. [Wilmington, NC]. pp. 1A, 8A, and 9A.

Olson, J. 1989, April 3. "Development thrives on coast". Wilmington Morning Star. [Wilmington, NC]. pp. 1A, 8A, and 9A.

Owens, D. W. 1985. Coastal management in North Carolina. American Planning Association Journal 51: 322-329.

Owens, D. W. 1987. North Carolina regulatory systems for development. In: Coastal Zone '87. eds. O. T. Magoon, H. Converse. D. Miner, L. T. Tobin, D. Clark, and G. Domurat. (2): 1480-1486.

Parker, J. 1989. Personal communication. Chief Permit Officer, Division of Coastal Management. Raleigh, NC.

Phillips, J. D. 1985. Pamlico river shore development trends, 1976-1984, and conservation alternatives. Pamlico-Tar River Foundation, Washington, NC. 6 pp.

Pilkey, O. H., Jr., W. J. Neal, and O. H. Pilkey, Sr. 1978. From Currituck To Calabash. North Carolina Science and Technology Research Center. Research Triangle Park, North Carolina. 228 pp.

Richardson, D.K. 1978. The Cost Of Environmental Protection: Regulating Housing Development In the Coastal Zone. Center for Urban Policy Research. Rutgers-The State University of New Jersey, New Brunswick, New Jersey. 278 pp.

Scheideler, W. 1989. Personal communication. Statistician, Management and Information Services. Office of State Budget and Management, Raleigh, NC.

Stick, D. 1982. Historical perspectives of Albemarle Sound, pages 3-6 In: Albemarle Sound trends and management. UNC Sea Grant publication SG-82-02. 92 pp.

Sunset Beach. 1987. Town of Sunset Beach Land Use Plan Update. 78 pp.

United States Bureau of the Census. 1977. Construction Reports-Housing Units Authorized by Building Permits and Public Contracts, Annual 1976. U.S. Government Printing Office, Washington, D.C.. 110 pp.

United States Bureau of the Census. 1979. Construction Reports-Housing Units Authorized by Building Permits and Public Contracts, Annual 1978. U.S. Government Printing Office, Washington, D.C.. 108 pp.

United States Bureau of the Census. 1983. Construction Reports-Housing Units Authorized by Building Permits and Public Contracts, Annual, 1982. U.S. Government Printing Office, Washington, D.C.. 110 pp.

United States Bureau of the Census. 1985. Construction Reports-Housing Units Authorized by Building Permits and Public Contracts, Annual, 1984. U.S. Government Printing Office, Washington, D.C.. 110 pp.

United States Bureau of the Census. 1987. Construction Reports-Housing Units Authorized by Building Permits and Public Contracts, Annual, 1986. U.S. Government printing Office, Washington, D.C.. 110 pp.

United States Department of Interior. 1987. Draft report to Congress: coastal resources system, executive summary. Coastal Barrier Study Group, Washington, D.C.. 25 pp.

Wrightsville Beach. 1986. Wrightsville Beach, North Carolina CAMA Land Use Plan. 87 pp.